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BUFFALO SOCIETY OF NATURAL SCIENCES

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The
Great Blue Heron (Ardea Herodias) in New York State.

By OTTOMAR REINECKE,
Buffalo, N. Y.

Up to a few years ago the attention of the traveler in the Southern States, particularly in Florida, Georgia, Louisiana, as well as in the Bermudas, was attracted by the enormous colonies of the Great Blue Herons, Snowy Herons and Egrets which were met with on every hand, and even the Scarlet Ibis, one of the most gorgeous of birds, was at one time very numerous. At the present time some of these birds are practically exterminated, and the numbers of other species have been brought to a very inconsiderable figure, due to the demands of fashion and the deadly work of the plume-hunters to supply these demands. At present the Flamingo, a most beautiful and stately species, is resident in the United States only in the vicinity of Cape Sable, where in 1896 Mr. W. E. Scott observed a flock of about a thousand birds. Another exquisitely beautiful bird, the Roseate Spoon-bill, was commonly seen in Florida, but continued persecution has so reduced its numbers that Frank M. Chapman, Assistant Curator of the Department of Ornithology of the American Museum of Natural History, New York City, during a period of four winters passed in different parts of the State did not observe a single specimen. It nests in the extreme Southern part of Florida, generally during January and February, and, after the young have been reared, wanders northward.

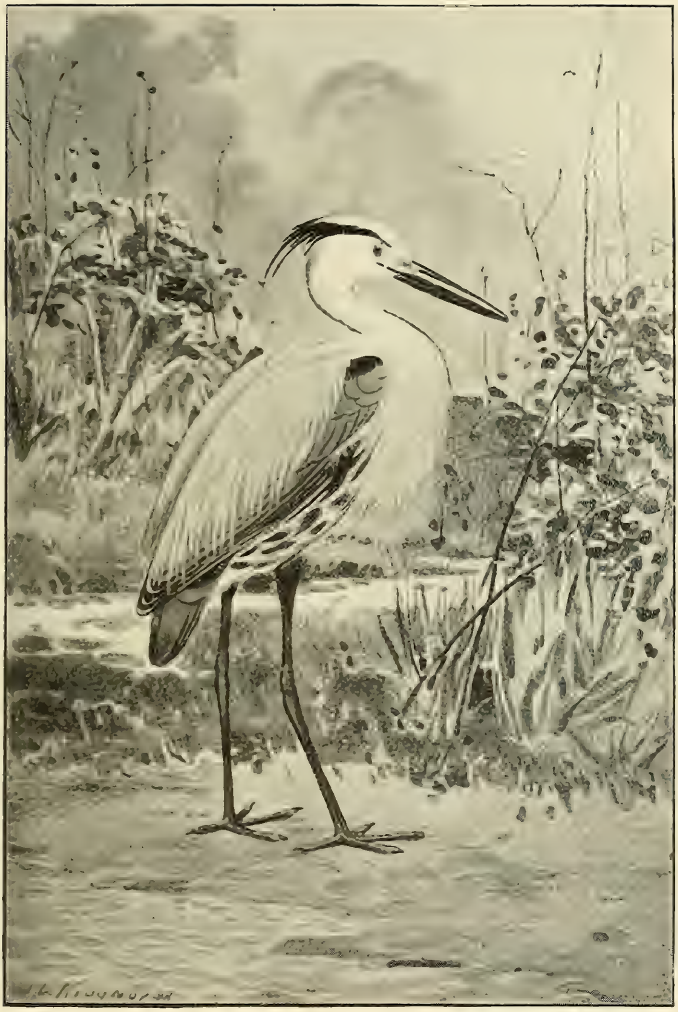
At present the Great White Heron, a larger bird even than the Great Blue Heron, is common on the coast of southern Florida, especially in the vicinity of Cape Sable. According to Chapman, the tourists who went to Florida about forty years ago often observed certain parts of the country fairly white with the American Egrets, so that occasionally the islands glistened in the sun like banks of snow. Now, however, one may search for miles in their old haunts in vain, possibly observing a solitary specimen in the distance which notes your approach from afar and, before you are within rifle shot, takes wing with a squawk of fright. The rapid extermination of these beautiful birds, whose commercial value lies in a few delicate plumes, is one of the saddest features in the history of our native fauna. To supply the demand for some article which contributes to our comfort or happiness, we see species after species almost immediately wiped out of existence.

A particularly unfortunate feature of this work is found in the fact that the "aigrettes" are worn by the bird only during the breeding season and consequently for each adult bird killed we must estimate a whole nest full of young left to starve for the lack of parental care. The odors arising from the decaying bodies of these young birds in the nesting places have been observed many miles out at sea.

One plume-hunter was heard to boast proudly of killing three hundred Herons in a "rookery" in one afternoon and another stated that he and his companions had killed 130,000 birds, Herons, Egrets and Terns, during one winter.

To any fairminded person the story of the destruction of these birds to satisfy human vanity is a deep stain on the history of Florida.

The Snowy Heron, the most dainty and graceful of the herons, has now become the rarest, the delicate aigrettes which it donned as a nuptial dress being its death warrant Fashion demanded from the bird its wedding plumes and the demand has been supplied. Mercilessly they were shot down at their roosts or nesting grounds, the coveted feathers were stripped from their backs, the carcasses left to fester in the sun and the young in their nests left starving within a few feet of the decaying bodies of their parents and all this in



GREAT BLUE HERON

order that "my lady's" bonnet might be adorned with the little tuft of feathers," so pretty and so becoming." Mr. R. D. Hoyt, a noted naturalist, residing in Seven Oaks, Florida, wrote me as follows on the 15th of November, 1907: "I will tell you right here that if Fifty Dollars were offered for the skin of a Snowy Heron, it would not be forthcoming. The birds have been entirely exterminated."

One of the present game wardens in Florida who now is giving his attention to the protection of our bird life admits that he, previous to his appointment, shot 2500 White Egrets. Not only were these finely plumed birds made to suffer, but the Least and other Terns which in breeding time covered with their nests the small islands along the coast of this State in such numbers that it was difficult to walk on these islands without stepping on the eggs, have been nearly all destroyed. In Europe at the mouth of the Elbe the plume hunters have almost exterminated the beautiful Least Tern so that the Government has been compelled to take a hand and stop this detestable slaughter by law.

Now let us consider the occurrence of the Great Blue Heron in our own immediate neighborhood. About forty years ago there were four colonies of these birds within the radius of fifty miles of Buffalo but these are now almost extinct. One was located near Shelby, Orleans County, New York, but the large tract of timber was cut down and the heronry exterminated. Another was in the Cherry Creek territory in Chautauqua County which I visited with my son on the First of May, 1898. It then contained from 12 to 15 nests. In this colony the birds were building in large and very high pine trees, while in the other heronries lofty elms are preferred. The nests were mostly high in the air and my son undertook to climb to one of them up a pine tree which measured about 9 feet in circumference. When he encountered the first branches he was obliged to force his way through the heavy needle twigs in order to reach the nests 112 feet above the ground. Resting several times he was finally able to approach the nest which was four feet in diameter and from 12 to 18 inches thick, constructed of heavy twigs and branches, many of them more than an inch thick, and lined with finer material. The two beautiful dull blue eggs now adorn our collection. The effort to reach the nest was so great that he did not feel equal to another climb.

The previous year some of the farmers in the neighborhood had made a raid on the old and young herons because they were destroying the trout fry planted by the State Fish Commission in the water of a nearby stream. The birds, old and young were shot down and thrown in a pile to decay. The swamp was finally drained, the trees cut down and now no Herons are found in this locality.

The third heronry was located near Leins Creek west of Chippewa, Ont. It was only a small affair, never more than 5 or 6 nests. Owing to the location chosen, being very close to much traveled highways, it was finally abandoned by the herons.

At present the only heronry existing in this part of the State is located about fifty miles northeast of Buffalo in Orleans County, about half a mile south of the county line, in a swamp lying partly in Orleans and partly in Genesee County. It is a circular rise in the ground and surrounds an almost inaccessible territory covered with water several feet deep in places, outside of which high land, the swamp extends for many miles, its outlet being Oak Orchard Creek. The territory occupied by the birds is from one to four miles in diameter. The farmers owning the lands adjoining have tried repeatedly to get State aid to drain this swamp as the heavy expense which would be incurred is too great to be born by them without outside help. The muck in some places is 18 feet deep making this country one of the finest fruit growing territories in the State, the apple crop, according to reports, in Orleans County for last year, approaching Five Million Dollars in value, but why the taxpayers of other counties of the State should contribute to create a bononza for Orleans County is hard to comprehend. It is interesting to note that the pressing demand for barrels to ship the apple crops, has become a factor in the destruction of the timber used by the birds in the present heronry.

Twenty years ago this heronry was a quarter of a mile northwest of where it is at present located. At that time the colony consisted of about 150 pair of herons. The trees that are occupied are destroyed in time by the birds and they are then obliged to seek new localities for their nests.

APRIL 29th, 1907

The colony gradually diminished until about 1900 when it contained less than 40 nests. This falling away was due to a large extent to the wholesale slaughter of old and young, which was carried on nearly every year about the time that the young began to fly. The Great Blue Heron feeds almost entirely on fish and for this reason is destroyed in large numbers as an injurious bird.

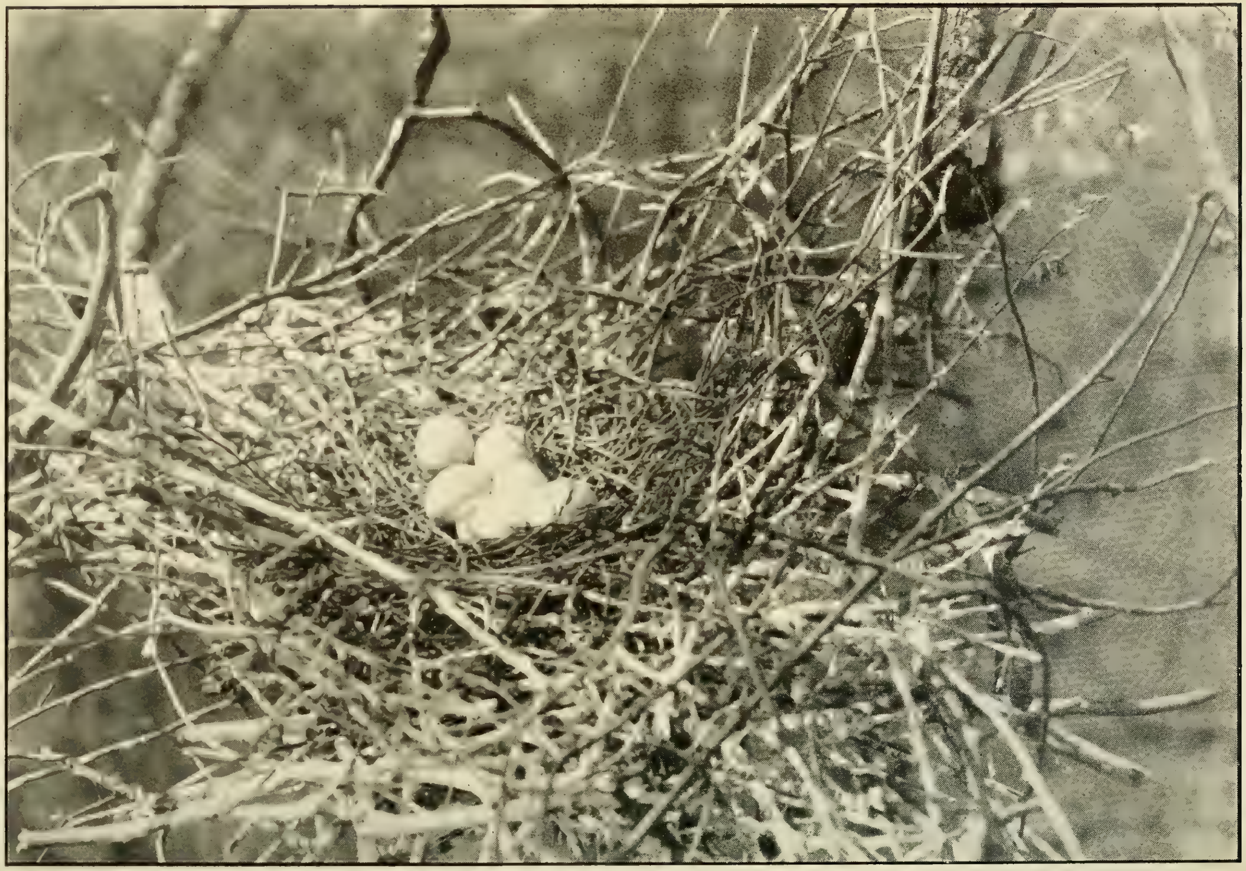
Since 1900 the birds have not been destroyed and they have gradually multiplied until the colony now contains about one hundred nests. The bird is very wary, is powerful and strong, has practically no enemies outside of man, is hardy and long-lived and the numbers would undoubtedly increase were they not molested by human beings.

Fearing that the colony might be destroyed by the draining of the swamp to reclaim the land, I determined to visit the heronry as many times as possible during the past year and secure pictures of the birds and their nests at different stages of their lives. I called on several of our local naturalists for help in this work and they volunteered their services at a moment's notice and I now take this occasion to extend them my hearty thanks for their help.

The Great Blue Herons arrive from the Southern States in the latter part of March and seek their old nesting places in the highest points of the elm trees. Occasionally there are a large number of nests in one tree, a few years ago I noted eleven in one large elm but this tree was blown down during a heavy gale. The picture shows an old and experienced male Heron surveying the surrounding nesting sites. They return to their former roosts, look them over critically and discuss their condition and availability with their accompanying mates. In a few days they clean and repair their old homes in preparation for their coming happy family.

To satisfy their ravenous appetites they often fly fifty miles or more to feeding grounds, because the immediate neighborhood cannot supply them with sufficient food. In returning from their foraging trips they utter a loud croaking. When disturbed in the heronry they fly in circles overhead and croak their disapproval of the intrusion.

The birds build a large bulky nest from three to four feet in diameter and twelve to eighteen inches thick, depend-



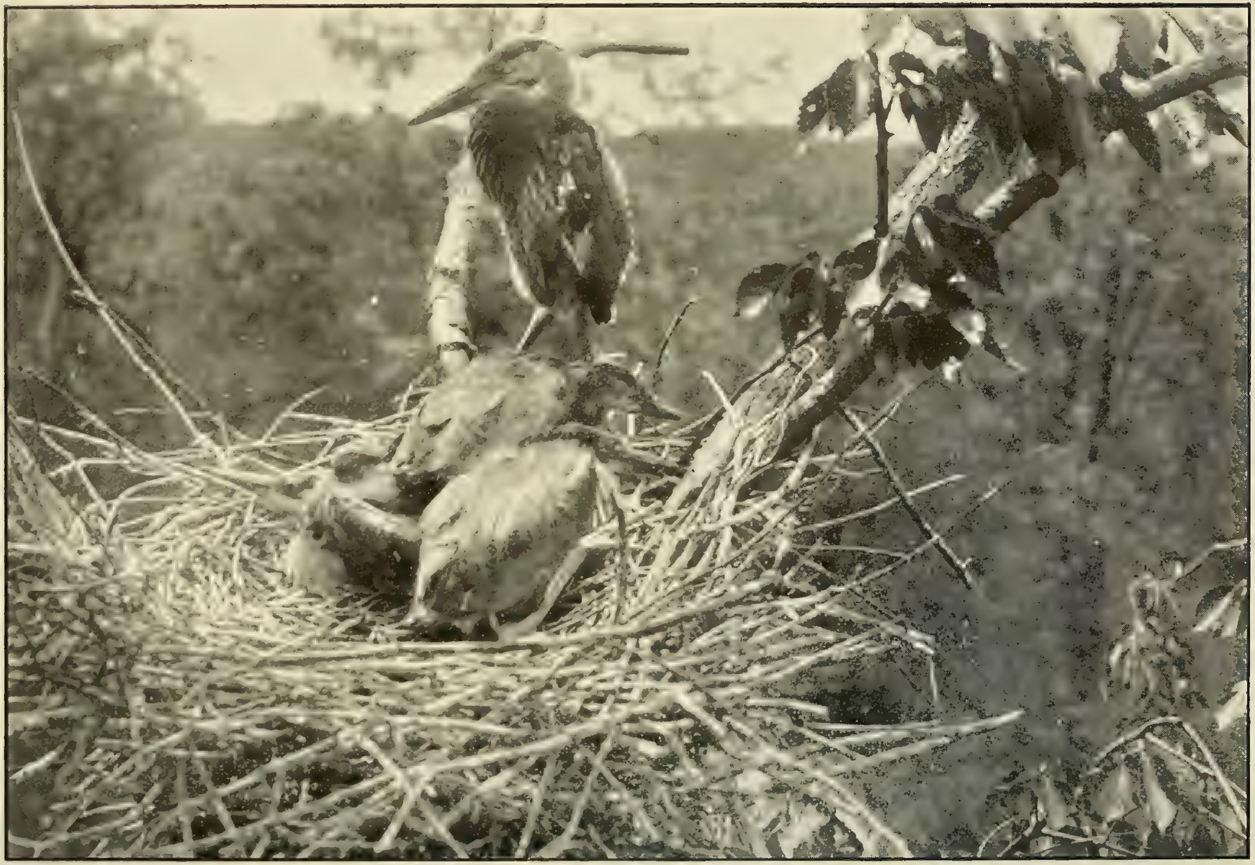
APRIL 29th, 1907

ing on the length of time they have been occupied. The birds add to them every season building them of stout twigs, lining them with strips of bark and placing them invariably in the highest elms from 100 to 120 feet. They would afford a very interesting specimen of bird architecture in any collection. About the middle of April everything has been prepared and in shape for the family.

Most of the authorities state that the Great Blue Heron lays from three to four eggs, but this does not correspond with our experience. We found as a general thing, that the nest contained sets of four or five and several with six. They are usually of a dull blue color although we have one set of four eggs which are nearly white.

On April 29th, the proper time for the eggs, we made another visit to the heronry. Leaving our baggage at a hotel near the railroad station, we procured a commodious two seated rig and started for the swamp amid the interested comments of the occupants of the hotel. The horse had a habit of jumping constantly on all fours which perplexed us somewhat until we discovered that he was totally blind. The effort required to keep the animal in the road required all the driver's attention, the rest of us keeping up an animated discussion on the subject at hand. Finally reaching a farm house near the heronry, we found some enthusiastic farmers who went with us and carried part of our heavy outfit. It is a very difficult trip to the swamp, the water in some places being waist high, making it necessary to wade and carry the equipment about our shoulders. The nesting site being reached, we promptly got in working order, putting on our climbers and starting up the trees. The elms are very tall, some as high as 140 feet. On reaching a suitable situation above a nest, a strong cord was lowered and the camera attached to it and drawn up. After some search we found a nest with six eggs, a picture of which is shown. Before coming down, the photographer took several exposures to insure a perfect picture.

Our final visit made on the 24th of June, some two months later to procure pictures of the full fledged young was quite successful. By this time the foliage was very thick making it much more difficult to find the nest. Under the guidance of

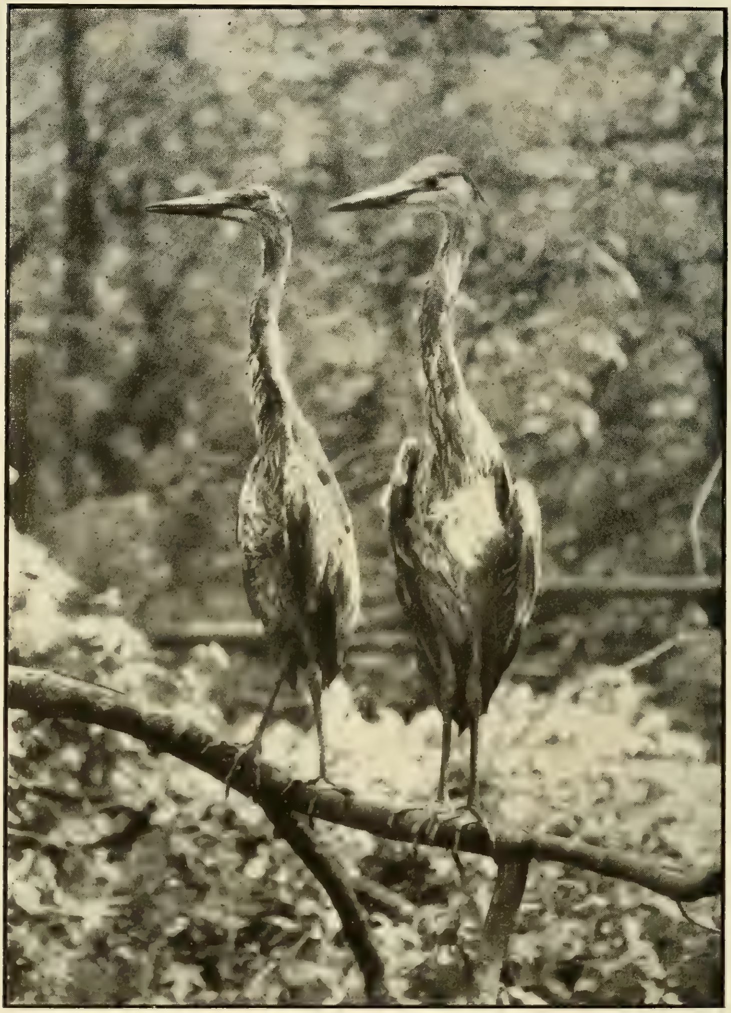


JUNE 24th, 1907

the same two farmers several were located. In the attempt to reach the nesting sites, I slipped on the wet ground and went into the mud well beyond the top of my high boots. After searching out a number of nests that we thought were suitable, with the help of the irons we proceeded to climb the tree. The bark of these elms is from 1 to 1½ inches thick, making it necessary to plant the spurs very deep to sustain the weight of the body. We slowly ascended the trees while the disturbed Herons circled over us with loud croaking, alighting occasionally on some high point to watch our maneuvers. Great care is necessary for approaching the nest from below as the slightest disturbance of the nest brings down a shower of the dry white droppings of the birds and this material is extremely irritating in case it happens to reach an eye. As we approach the home the female leaves the nest and flies in wide circles over our heads croaking defiance to the intruders. On this trip to our delight we found the young birds almost fully developed. They are generally able to leave the nests July 1st. It was very difficult to get good pictures the foliage being very thick but the results shown in the accompanying photograph prove that we were quite successful.

We now tried to get several of the young Herons out of the nest. This task was exceedingly difficult as they are big awkward birds and cling tenaciously to every branch within reach. We desired to get a photograph of the young birds out of the nest and so persevered and one of the pictures shows two of the young birds on the limb. The surrounding vegetation and foliage is so thick that when on the ground it is almost impossible for the birds to rise into the air. With the help of our farmer companions we finally succeeded in bringing out the camera and some of the young birds. The traveling is sufficiently difficult of itself and this difficulty is, of course, greatly enhanced when one's arms are utilized in the task of carrying a heavy weight which must be kept dry at all expense. On the edge of the woods we took another photograph of one of the young which is also shown.

On returning to the farm to resume our trip in the wagon we found it very difficult to handle the young Herons. Their bills are very sharp and a single thrust of one of these powerful weapons have been known to penetrate the brain of a full grown pointer dog. We were obliged to procure a bag from one of our friends in which the birds were placed safely and they now are receiving their friends and visitors in one of the commodious cages in the Buffalo Zoo.



JUNE 24th, 1907

Nearly all of the Zoos in the United States have been provided with specimens of these birds from this heronry. When properly treated their existence can be maintained in captivity for a number of years. They prefer to pick their food out of the water and visitors at the Zoo watch with much interest the attempts of one of these birds which has unfortunately lost the sight of one eye to impale portions of food with its bill. It is sometimes necessary to make a half a dozen unsuccessful attempts before the coveted object is finally secured. In their natural state, however, these birds are wonderfully accurate with their bills, capturing a rapidly moving fish in the water without effort. They will stand for hours on one leg watching for their prey when suddenly with lightning speed the bill goes

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down with a graceful movement of the long neck and when the bird recovers its position the fish can be seen struggling in the grasp of its captor. Sometimes they will fly forty or fifty miles with food to supply their always hungry offspring. Their principal food is fish but woe betide any frog or snake who may be unwary enough to approach within striking distance of their powerful weapons.

The Herons of this section only raise one brood a year while in the southern states they frequently raise two. It is hoped that every reader of this article will use every effort to preserve this nesting site of these magnificent birds. In this connection the following clipping from the Buffalo Express of November 20, 1907 is of interest:

WANT STATE TO BUY SWAMP LANDS

Movement on Foot to have Tonawanda Swamp made a Forest Preserve.

WOULD BENEFIT CREEKS

Oak Orchard and Tonawanda Creeks may dry up if this Section isn't made a Reserve.

Special to the Buffalo Express.

Medina, Nov. 20.—The movement on foot to preserve the Tonawanda swamp as a forest preserve is meeting general approval. Assemblyman Eggleston has been asked to present a bill at Albany this winter to this end.

It is desired that the state reserve not only the Tonawanda swamp district, but buy all of the land adjacent to the canal feeder, which so frequently overflows and leaves a long trail of expensive claims for damage to crops and land. The aggregate of these claims alone, it is stated, would more than suffice to balance the entire expense of the reserve.

The Oak Orchard creek has its source in the swamp, as well as the Tonawanda creek. Both streams, is is said, will dry up if the swamp district is not preserved.

While a great deal has been done in the eastern end of the state for forest preserves, so far as can be learned this is the first effort made in this end of the state. The swamp district is not of a malarious nature and no reclamation is necessary on the ground of the general health. The idea will have the hearty support of nearly everyone in Orleans county. Niagara, Erie and Genesee counties, all of which contain a portion of the swamp district, will be asked to support the movement.

A Recent Occurence of the Pileated Woodpecker near Buffalo.

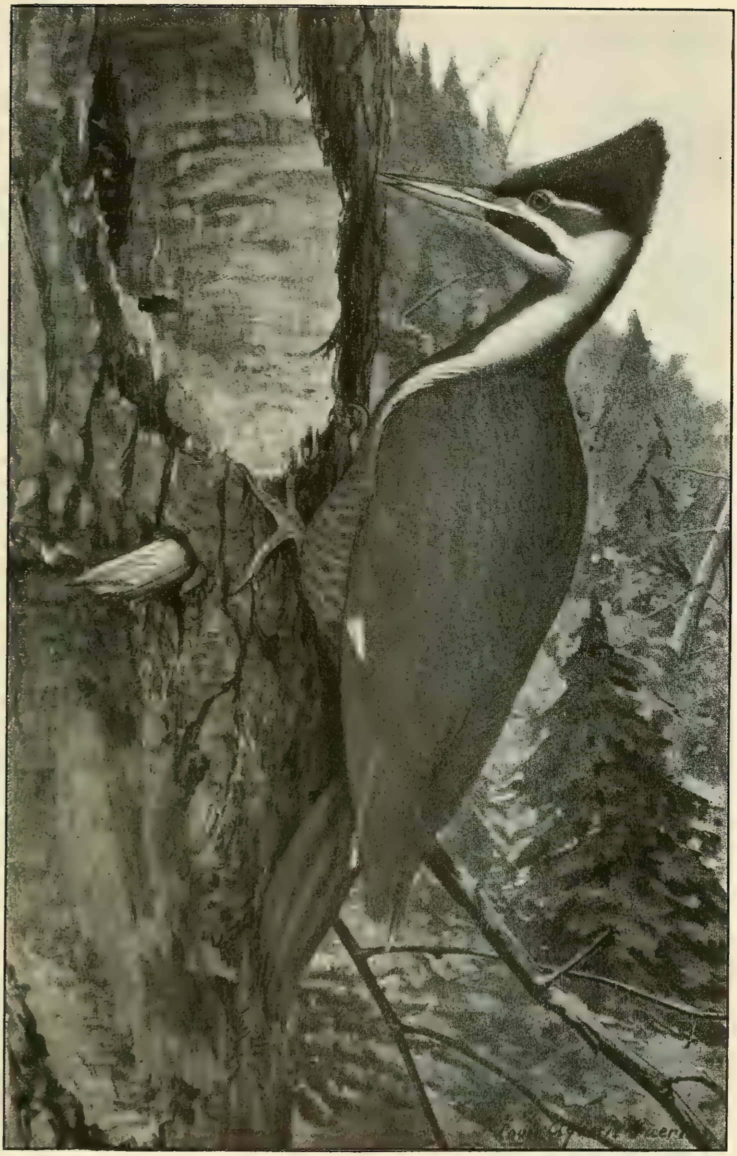
By Carlos E. Cummings, M. D.

From the viewpoint of the anatomical features, as well as in the interesting peculiarities of life and habits, the woodpeckers represent one of the most unique groups in our avian fauna. We find among these birds certain universal anatomical characteristics. The feet are perfectly zygodactyle by reversion of the fourth toe, the tail feathers stiff and sharp, and the chisel-like bill peculiarly adapted for the purpose of chipping away the wood of the trees in search of food. An arrangement of the hyoid bone, in the form of long slender, flexible filaments extending over the skull behind between the skin and the bone, surrounded by highly developed specialized muscles, enables the tongue to be extended several inches beyond the bill. The tongue itself is slender, sharp pointed and thickly barbed on its extremity. The small size of the neck as compared with the size of the skull makes it impossible to invert the skin over the head, a process commonly employed in the skinning of other birds during the process of mounting. The skull itself is extremely firm and solid, the bone possessing almost the hardness and rigidity of ivory.

We find in studying the habits of the birds that each of these anatomical peculiarities serves a definite purpose in the life of the creature. By means of the bill the bird perforates the bark and wood of the trees to reach the larvæ of the insects feeding beneath it. This cutting away of the wood is done by a series of powerful strokes of the bird's head, in much the same fashion as a carpenter would use a chisel and hammer in shaping a piece of timber. During the process the bird clings to the rough bark of the tree, the spoke-like arrangement of the toes being such as to afford a firm grip. The short stiff feathers ot the tail are pressed forcibly against the bark, making a rigid support on which the weight of the bird's body may rest and a leverage by which additional force can be given to the blow. The hole being made and the burrow of the grub exposed, the long tongue is then thrust out, the insect impaled on its barbed extremity, and thus drawn back to the bird's mouth. The birds display a very peculiar instinct in selecting a spot directly over the larva before beginning work, the hole being so located that it usually strikes directly above the grub. This boring does not injure the trees to the extent that might be imagined, the destruction of the noxious insects more than counterbalancing the damage done in the process. The name of "sapsucker" which is also commonly applied to these birds in certain localities is misleading, as their food consists of the larvæ of insects, varied occasionally by a meal of nuts or berries. In building the nest, they make use of their powerful bills in excavating holes in the trees, sometimes to a considerable depth, where they lay a number of round white eggs. The eggs are very beautiful, being pure white, the shell having a glossy smooth surface resembling very fine porcelain. They are not in any sense birds of song, their note being a harsh cry.

In some instances the plumage presents very brilliant colors, reds and yellows being common and often, as in the case of the common red head, possessing a highly lustrous surface. There are something like 250 well determined species, covering nearly every part of the globe, about thirty of which are described as being present in the United States and of these nine have been recorded as being found in New York State.

The flicker or golden-winged woodpecker is frequently seen in the parks of our cities as well as in the woods. This bird has probably as many local names as any of our birds, being known as the high-holder, flicker, red shafted flicker, yellow hammer, pigeon woodpecker, and golden winged woodpecker. It is truly a beautiful bird, the breast being a light creamy yellow, marked with circular black spots, the back of the head and neck showing a bright scarlet crescent. The red-headed woodpecker is also common, the color of this bird being red, white and blue black. The head is of crimson, the breast and secondaries of the wings white, the back and wings a dull glossy blue-black. The downy and hairy woodpeckers are less brilliantly colored, being of a more uniform black and white. These birds are seen frequently in our locality throughout the



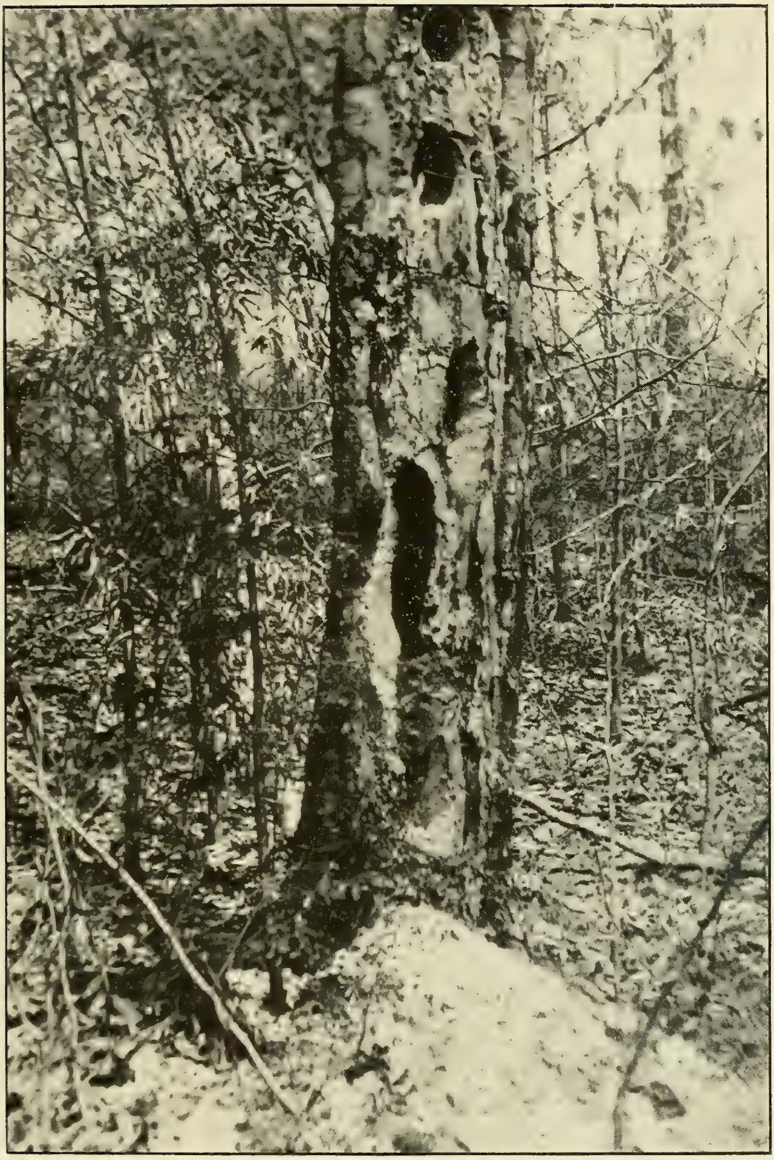
PILEATED WOODPECKER AT WORK

year, their drumming on the trees being heard in the woods on the coldest days of the winter. The largest bird of this family, the ivory-bill, so called from the appearances of the beak, is not found in our locality, and is practically extinct in the regions of the southern states where it was at one time quite common.

The largest and most powerful of the wood-peckers of our own state is the pileated, so called because of the bright red crest or cap covering the top of the head. The bird is of a general dull black color, relieved by the crimson crest and a white stripe running from the nostrils on either side of the head and neck to the side of the breast and under surface of the wing. The feathers of the flanks and breast are occasionally tipped with white. The female resembles the male excepting that the crest is not so brilliantly colored, especially on the front portion. The bird is about eighteen inches long and spreads about 28 inches, the female being slightly smaller. It was at one time common throughout most of the northern United States up to the 63 parallel, but owing to its timid nature is one of the first to withdraw and disappear before the progress of civilization. For that reason it is now but seldom seen in our neighborhood, although resident in the Adirondacks and some other parts of the state.

This bird is also honored by several local names, being called the black woodpecker, the black cock and the cock of the woods. It is very energetic, going at its work with great enthusiasm, but keeping an eye open for any possible danger so that it is very difficult to approach. The flight of the pileated woodpecker differs somewhat from the movement of the other woodpeckers. Most of these birds move through the air in alternating descending and ascending lines, but this bird proceeds forward in a more uniform direction. In common with the other woodpeckers he does not make very long flights, gliding easily from one tree to another in search of food.

The mating season of these birds is usually in April. They excavate a deep hole in a decayed tree, cutting away the wood with such vigor that the chips are sometimes from four to five inches long and half an inch in thickness. The eggs are from three to five, of a beautiful white color, as is the case of the eggs of the other woodpeckers. Frequently the nest is used season after season for a number of years.



WORK OF THE PILEATED WOODPECKER

Owing to the fact that our own state is one of the most thickly settled in the Union, the occurrence of this bird in our immediate locality at the present time is very unusual.

Mr. Savage reports having seen the bird several times in the last few years. In April, 1907, Mr. Savage and Mr. E. P. Van Duzee, while strolling through the woods of North Boston about twenty miles south of Buffalo, discovered the trunk of a beech tree about 40 feet high which bore the unmistakable evidence of having been the object of attack of this bird. In several places enormous hollows had been cut away extending to the very heart of the tree and at the foot of the tree was heaped a mound of chips which amounted to about two bushels in volume. The hollows were on one side of the tree, the lower one, the largest, about 6 inches wide extending about three feet up and down the trunk. This penetrated quite to the heart of the tree, which was dead and decayed throughout a large part of its extent. Another about a foot by four inches in size, and two smaller ones of a more circular shape were seen just above, the whole extent of the excavation being in a surface about six feet long. The wood of the tree is practically honey-combed with the circular borings of the larvæ of the horn-tail (tremex columba) in search of which the bird had done the excavating in question.

Realizing the importance of this specimen as showing the power of the bird as well as its occurrence in this locality, arrangements were made by the Society of Natural Sciences to secure this specimen and preserve it permanently in our Museum. The tree stood on the property of Mr. J. A. Hutchinson, and through the efforts of Mr. Van Duzee it was cut down and brought to our rooms where it can be seen in the department of Ornithology. Mr. Savage secured a number of photographs, one of which is reproduced with this article.

Shortly after the discovery of the tree Mr. Savage reports that the bird was seen and allowed him to approach sufficiently near so that by the aid of his glass there was no doubt about the identification of the bird. The mate was heard calling in the woods a short distance away and was later seen and identified by Mr. Savage. Certain other excavations of a less extensive nature showed that they had been busy in the neighborhood for sometime.

The Whistling Swan on Niagara River.

By James Savage, Buffalo, N. Y.

The Whistling Swan, *Olor columbianus*, is a rare migrant along Niagara River. It may be said to occur regularly about the middle of March and casually in the fall. Its capture however would scarcely be possible were it not for its proneness to float down the river to injury or death at Niagara Falls.

I am told by observers living at Niagara Falls in a position to know, that scarcely a year passes without one or more swans being sacrificed at the Cataract. In March 1906, about a score made the fatal plunge and in the same month, 1907, five were taken but no such catastrophe in the swan world has ever been described as that which happened on March 15th 1908 when more than one hundred of these majestic birds, journeying toward their summer home near the Arctic Circle, came to an untimely end.

A severe rain-storm accompanied by thunder and lightning prevailed during the greater part of that day (March 15, 1908). About eleven o'clock in the morning, between showers, William LeBlond of Niagara Falls, Ontario, was engaged in removing from the ice bridge a temporary structure that had been used during the winter "season" as a souvenir and refreshment stand, when he was startled by a loud cry. Turning around, his attention was first attracted to a swan struggling in the water at the upper edge of the ice bridge, but on looking toward the falls he saw a great company of swans in distress coming toward the bridge. The scene that followed was a sad one for any bird lover to contemplate.

These splendid birds, helpless after their terrible plunge over the cataract, were dashed against the ice bridge by the swift current, amid cakes of loose ice which were constantly coming down from the upper river. Some had been killed outright by the falls. Others, unable to fly because of injury to their wings, attempted to stem the rushing waters, but here their wonderful swimming powers were of no avail. They were soon imprisoned in the ice where their pitiful cries were heart-rending.

The game laws of Ontario still permit the taking of geese and swan in the spring until April 30th and it was not long before men and boys, armed with guns and sticks, availed themselves of the privilege and became the chief factors in the closing scene of Nature's great tragedy; — the sacrifice of the swans.

Injured Swan. American Falls in background.
Photographs by the Author

The news of a "Great Slaughter of Wild Swan" appeared in the Buffalo newspapers on March 17th and the writer started for Niagara Falls forthwith to investigate the matter. As nearly as could be ascertained from interviews with various participants in the "slaughter" the number of swans taken on March 15th, was one hundred and two. Not all of these were taken on the ice bridge. A number were pulled out of Bass

Rock eddy just below the power house of the Ontario Power Company and within 150 yards of the Horseshoe Falls

On the morning of the 18th of March two more swan were taken at the ice bridge and a third was picked up alive on the shore at Bass Rock eddy. This latter bird I secured within a half hour after it was found and the picture shows it still in the arms of its captor. It was unable to stand on its feet or to use its wings and was taken in that condition to Buffalo and placed under the care of the curator of the Zoo in Delaware Park. It quickly recovered from its bruises and shock and now (March 25th) may be seen floating gracefully on Park Lake.

On March 22nd I went again to the Falls and saw five more swans that had just been taken by LeBlond while six had been picked up at Bass Rock eddy early that morning. Three others were seen in the gorge but were able to mount into the air and fly over the falls to the upper river. I went up the river to the historic village of Chippewa hoping to find a remnant of this swan brigade, but there was not one to be seen on the river below Navy Island. A flock variously estimated to number 20 to 60 individuals had been seen by a number of people the day before. I was unable to learn that any swans had been shot above the Falls although they had been seen there almost every day for a week.

Rev. J. Hibbert Langille in his book, "Our Birds in Their Haunts", tells of finding a dead swan on the shore of Lake Ontario at the mouth of Johnson's Creek, which he says "by some means unknown, has perished in the course of its long migration". I have little doubt that it met death in the Cataract of the Niagara.

Mr. J. L. Davison * says "Nearly every season a number of this species (Whistling Swan) are taken in a wounded condition in Niagara River, below the falls. They are probably wounded by flying into the falls during storms while migrating during the night. I have also been told that dead specimens have been found on the shore of Lake Ontario near Niagara River, after the ice had broken up in the Spring" While it may be true that birds sometimes fly into the falls from the gorge below, I know that the swans in the present instance

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* "Birds of Niagara County, N. Y." By J. L. Davison, Lockport, N. Y. Forest and Stream, Sept. 19, 1889.

went over the precipice from the upper river. They were seen above the rapids before eleven o'clock on the morning of March 15th.

After a long tiresome flight from Chesapeake Bay the open water of Niagara River would be a welcome sight to this ill-fated flock of swans. Resting from their labors they probably drifted down stream unsuspecting danger until too late to save themselves from plunging into the turbulent waters of the Canadian Rapids. These rapids begin abruptly with a drop of about ten feet in a line running across the river from the head of Goat Island to the gate house of the Ontario Power Company on the Canadian shore. I have watched gulls float down over the crest and spring into the air from the descending water. "Swan being so large and heavy cannot easily take wing but are obliged to force themselves over the water against the wind, by rapid and powerful beats of the wings and feet until obtaining the requisite momentum, they are lifted into the air".* When they reach this line of breakers they are prob-

Canadian Rapids from ice fender of the Ontario Power Company ably carried down and completely submerged, after which by reason of confusion or inability, they cannot fly but are rushed forward and a minute or two later are carried over the brink of the precipice and plunged 160 feet into the gorge below.

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* "The Wildfowl of the United States", by Daniel Giraud Elliot.

Swans are not the only waterfowl that are sacrificed at Niagara's shrine. On the occasion of my visit March 18th, I saw a handsome male Canvasback duck, *Aythya vallisneria* (Wils), come down against the ice bridge. It was unable to fly but succeeded in extricating itself from the moving ice and gaining a foothold on the bridge at a point where to attempt to catch it alive would have been a perilous undertaking. Later in the day I saw an American golden-eye duck *Glaucionetta clangula americana* (Bonap), struggle out of the foaming water below the Horseshoe Falls into Bass Rock eddy and with great difficulty reach the shore. It made no attempt to escape when picked up. While no external injury was apparent, it was unable to walk or fly. It recovered however, from its shock by

Bass Rock Eddy at extreme left.
Ice Bridge and American Falls in distance

the time Buffalo was reached and when an opportunity was given, it flew off as strong as ever in the direction of the River.

Regarding the disposition made of all these swans which in the aggregate would approximate a ton in weight, I will say that the cygnets were nearly all selected at once for the table and many a tough old bird as well. A large number, however, have been preserved by the taxidermists of Niagara Falls and Toronto. Five fine specimens secured by Mr. Ottomar Reinecke are being prepared as a splendid group for the Museum of the Buffalo Society of Natural Sciences by its taxidermist, Herman Grieb. The latter reports that the stomachs of the birds examined by him were empty. One specimen, a female and not the largest, measured 51⅛ inches in length and 81 inches from tip to tip of its extended wings. I saw no less than 50 of these dead birds and looked them over carefully thinking that possibly there might be a Trumpeter Swan, *Olor buccinator* (Rich.), among them but none was found.

While the killing of the wounded swans at the ice bridge was technically lawful and in a certain light might be regarded as an act of mercy inasmuch as without human interference most of the birds would probably have perished from their injuries or by starvation, yet it is greatly to be regretted that as many of the birds as possible were not taken alive and given an opportunity to recover. I believe that fully one-third of the 116 swans taken would have survived if given the proper care. But the impulse to kill was stronger than the spirit to save and not even a pair of these unfortunate birds was rescued from nature's doom and restored to nature's freedom.

Studies in North American Membracidæ.

By Edward P. Van Duzee

In the present paper I give the results of a systematic study of all the Membracids in my own collection and of such additional material as I could procure from my correspondents. With this material I have been able to recognize a considerable portion of the species published by Say, Fitch and Emmons and most of those of the more recent writers. It is quite possible that some of these determinations of the older species may have to be changed as the result of later studies and the acquisition of fuller material but I believe the most of them will stand as here recognized. A large number of our species were described by Say and Fitch, whose descriptions, especially those of Say, were concise and sufficient, and most of these species have been located with reasonable certainty. Emmons' species published in the Natural History of New York are generally recognizable by the excellent figures he gives while his descriptions are all but worthless. Fairmaire's descriptions are poor but he gives some figures and most of his North American species have been placed with more or less certainty. Of more recent work the best is that of Canon Fowler in the Biologia Centrali Americana. While he touches but few of our species his systematic work on the genera is excellent and it is of much value as supplementing the foundation laid by Stal. Dr. Goding's synopsis of the genera was the best for our fauna published to that time and his later catalogue listed our species as well probably as could then be done, but these papers were of little use in the determination of our species as his descriptions of new forms were poor and he gave no comparative notes to assist in locating the older forms.

In this paper, which must be considered merely as a contribution to our knowledge of these insects and in no sense monographic, I give synoptical tables of the subfamilies, genera and species, descriptions of the new forms that have come into my hands for study, and comparative notes on most of the less known of the older species. I have appended outline figures showing certain characters used by me in discriminating the species. Without such an aid it might be difficult to understand some of the comparative characters I have found it expedient to employ in the synoptic tables.

The list at the end of this paper includes all species known to me to occur in America north of the southern boundry of the United States, or that have been recorded therefrom. No attempt has been made to give the complete distribution of the species.

A few of the terms used may need a word of explanation. The *metopidium*, first used I think by Canon Fowler, is the front of the pronotum, perhaps best seen in *Ceresa* where it is bounded by the lateral carinate edges arising from the anterior angles, and meeting at or behind the middle to form the dorsal carina. The *suprahumerals* are the lateral horns placed generally on the edge of the metopidium some distance above the humeral angles. These also are best seen in *Ceresa*. The apex of the clypeus is ordinarily produced in a rounded knob below the line of the cheeks but sometimes its anterior aspect is bounded below by a ridge or angle that gives it, when viewed from before, the appearance of ending there. This angle may be advanced farther down toward the chest or altogether wanting, in which case I have styled the apex of the clypeus "incurved". In the *Telamonas* and their allies I have described the dorsal hump or crest as viewed from the side. My nomenclature of the elytral venation is that used by Fowler and others except that I have called the third apical areole the "*terminal areole*". It is a character frequently referred to in the specific descriptions. The same areole in the wing beneath is used in generic diagnosis.

It affords me pleasure to acknowledge the kind assistance received from many of my friends and correspondents, from whom I have received material of much service to me in these studies. Perhaps most useful to me was the very full collection of Membracids in the Cornell University collection for the loan of which I am indebted to Professors MacGillivray and Bradley. Mr. W. T. Davis of New Brighton, Staten Island, has sent me for study a remarkably fine series of Membracids taken by him in the vicinity of New York City. Interesting material has also been received from Mrs. Annie Trumbull Slosson, Dr. E. D. Ball, Dr. E. P. Felt, Prof. Franklin Sherman Jr. and others.

The following synoptical table of the subfamilies of the Membracidæ is copied largely from that given by Canon Fowler in the Biologia, which in turn was founded on that of Stal.

Scutellum wanting or entirely concealed by the pronotum, 1.

Scutellum distinct and more or less uncovered, with its apex nearly always excavated or broadly sinuated and furnished on each side with acute angles, 6, *Centrotida* Stal.

1. Tarsi of equal length or the posterior pair longest, 2.

–. Posterior tarsi much shorter than the anterior and intermediate, 4, *Hoplophorida* Stal.

2. Tibiæ, at least the anterior and intermediate, dilated or foliaceous, 5. *Membracida* Stal.

–. Tibiæ simple or very slightly dilated, never foliaceous, 3.

3. Third apical or terminal areole of the corium elongated, never petiolate, 3, *Darnida* Stal.

–. Third apical or terminal areole of the corium petiolate, the adjacent areoles contiguous before it, 4.

4. Elytra externally broadly coriaceous and opaque, with the veins of the coriaceous portion scarcely distinguishable and the free margins broad. 1, *Tragopida* Stal.

–. Elytra entirely membranous with the veins distinct, or coriaceous and punctured at the base only. 2, *Smiliida* Stal

Subfamily Tragopida Stal.

This subfamily is distinctively South American in its distribution. But three species extend their range so far north as Panama. Goding in his catalogue credits *Tragopa dimidiata* Fairm. to the West States, quoting Riley, but this is almost certainly an error of determination and I prefer to omit it entirely from our fauna.

Subfamily Smiliida Stal.

The *Smiliida* are more northern in their distribution and form by far the greater part of our North American Membracid fauna. I prefer to follow Dr. Goding in dividing them into tribes and give here a table for distinguishing these.

Elytra free with the clavus uncovered, its interior margin touching the external margin of the pronotum, 1, *Cerasini* Godg.

Clavus and frequently a part of the corium covered by the pronotum, 1.

1. Wings with the terminal areole sessile, its base truncated, 2, *Telamonini* Godg.

–. Wings with the terminal areole triangular, stylate, 2.

2. Base of the corium with two closely contiguous veins, 3, *Polyglyptini* Godg.

–. Base of the corium with three veins, usually contiguous, 4, *Smiliini* Godg.

Tribe Cerasini Goding.

Corium with two veins contiguous at base, sometimes united in one, 1.

Corium with two distinct veins at base, contiguous at most but for a short space at base where they are subobsolete, 2.

1. Pronotum armed with suprahumeral horns, sometimes reduced to mere tubercular angles, 1, *Ceresa* A. & S.

–. Pronotum without suprahumeral horns, the sides of the metopidium at most obtusely angled, 2, *Stictocephala* Stal.

2. Elytra with five apical areoles, veins distinct, 3, *Acutalis* Fairm.

–. Elytra with four apical areoles, veins indistinct, 4, *Micrutalis* Fowler.

Genus Ceresa A. & S.

In this large genus our species are numerous and closely related and show considerable variability in the form of the suprahumerals making it a difficult genus to study. I give below the results of my studies on the material now in my collection. Further explorations will doubtless bring to light many new species from the south and west. The following key it is hoped will assist in locating the species here enumerated.

Brown species transversely banded with pale, 1.

Green, flavous or piceous species, not transversely banded, 2.

1. Elytra infuscated; suprahumerals horizontal, broad, triangular; sides of the pronotum with a broad pale spot generally forming a transverse band, and a narrower one near the apex, 1, *diceros* Say.

–. Elytra scarcely infuscated, suprahumerals almost terete, acute, strongly recurved; apex of the pronotum with the apical band only, but sometimes with an oblique line near the middle; a smaller species with a pale metopidium, 2, *albescens* n. sp.

2. Suprahumerals distinctly produced in horns, at times but short and triangular, 3.

–. Suprahumerals reduced to a mere angle or short tubercle, 10.

3. Clypeus short, at apex continuing the contour of the outer margin of the cheeks, 4.

–. Clypeus produced, forming an angle in the apical contour of the head, 5.

4. Larger, 8-10 mm., Suprahumerals prominent, acute, produced horizontally, little if at all curved posteriorly; metopidium transversely flat, 3, *bubalus* Fabr.

–. Smaller, 7-8 mm.; Suprahumerals short and broad, horizontal, strongly curved backward; metopidium transversely convex, 4, *brevitylus* n. sp.

5. Clypeus broad, almost truncated at apex and, with the loræ, abruptly produced beyond the line of the cheeks; pronotum little elevated, surface hairy; suprahumerals short, triangular, horizontal, scarcely if at all curved backward; metopidium transversely flat, females generally marked with black on the femora and pectus, males sometimes almost entirely black, 10, *basalis* Walk.

–. Clypeus triangularly produced beyond the line of the cheeks, 6.

6. Metopidium flat or concave between the suprahumerals, sometimes a very little convex at the middle, 7.

–. Metopidium transversely sinuated between the suprahumerals, the horns slender and strongly recurved, 9.

7. Larger, 8-10 mm.; suprahumerals long, subterete, sloping upward and curved backward, 5, *taurina* Fitch.

–. Smaller, 7-8 mm.; suprahumerals shorter, triangular, abrupt, horizontal, a little curved backward, 8.

8. Pronotum hairy; suprahumerals rather long, terete or nearly so; ultimate ventral segment of the female acutely emarginate; venter of the male concolorous; inhabits east of the Rocky Mts. 9, *borealis* Fairm.

–. Pronotum smooth; suprahumerals short, acute-triangular, scarcely terete; median notch of last ventral segment of the female rounded at apex; venter of male black; inhabits California, 11, *albido-sparsa* Stal.

9. Metopidium and dorsal line ferruginous brown, the carinæ piceous; length 8 mm., 7, *constans* Walk.

–. Green or greenish, the dorsal carina a little rufous, inclining to piceous, 8, *Palmeri* V. D.

10. Suprahumerals short-triangular but distinctly produced, 11.

–. Suprahumerals reduced to a mere angle, 13.

11. Metopidium transversely flat between the suprahumerals, its median carina distinct; face with conspicuous vertical striæ between the ocelli and eyes,
12, *brevis* Walk. female

–. Metopidium transversely convex between the suprahumerals, 12.

12. Sides of the metopidium slightly diverging upward, rectilinear to the short abrupt suprahumeral angles; face flat, longitudinally striate at base; apical margins rectilinear, medium carina of metopidium almost obsolete, carinate edges pale, 13, *brevicornis* Fitch

–. Metopidium low, its sides vertical for half its height, then abruptly diverging to the suprahumeral angles, median carina subobsolete; face short, irregularly rugose, the apical margins feebly arcuated; pronotum hairy, 14, *femorata* Fairm.

13. Metopidium moderately low, transversely convex; anterior edge broadly feebly arcuated above the vertex; face short, rugose, 15, *uniformis* Fairm.

–. Metopidium high, sides rectilinear and but slightly diverging upwards, its surface transversely almost flat, anterior edge strongly sinuated above the vertex; face long, minutely striate, 12, *brevis* Walk. male.

1. **Ceresa diceros** Say. Pl. 1, fig. 12.

This common and widely distributed species may be distinguished by its transversely banded pronotum. Amyot and Serville have figured and redescribed it as *Ceresa postfasciata.* Here it is most commonly found on elder bushes. The hind edge of the last ventral segment of the female is sinuated and a little oblique either side of the deep linear median notch; this notch is as wide as the oviduct and reaches at least half way to the base of the segment. The plates of the male attain the apex of the anal tube.

2. **Ceresa albescens** n. sp. Pl. 1, fig. 18.

A little smaller and paler than *diceros* to which it is closely allied. Pronotum as in *diceros* but with the suprahumeral horns more acute and recurved and tipped with black, and the apex longer and more slender. Face, front, and superior surface of the pronotum greenish- or yellowish-white with scarcely a trace of the maculations found in *diceros*; apex of the head less produced, the tylus scarcely longer than the cheeks. Sides of the pronotum paler, ferruginous, becoming somewhat fuscous posteriorly, irrorate with paler and marked with a pale marginal line and sometimes with an oblique median vitta; protracted apex whitish with a black tip and ferruginous median vitta; outer surface of the suprahumerals dark ferruginous, differentiated from the ferruginous sides by the pale lateral line which nearly attains the apex of the horns. Legs and beneath ferruginous, the femora darker. Last ventral segment of the female a very little oblique and rounded to the median notch which is triangular, acute and reaches the middle of the segment. Plates of the male not attaining the apex of the anal tube. Elytra almost hyaline, not smoky brown as in *diceros*, nervures ferruginous. Length 8-9 mm.

Described from several examples representing both sexes taken by me at Hamburg and Niagara Falls, N. Y., and at Effingham, Ks. This species looks much like a small pale *diceros* but may readily be distinguished by the whitish face and metopidium, its more acute and recurved suprahumerals, the longer and black-tipped pronotal apex, the shorter tylus, the shorter plates in the male, the form of the last ventral segment of the female, and the almost hyaline elytra.

3. **Ceresa bubalus** Fabr. Pl. 1. fig. 26.

Our largest native species of *Ceresa* and one of the most abundant and widely distributed. It has large triangular suprahumerals with the metopidium flat between them. The last ventral segment of the female is a little more oblique than in *albescens* and rounded on either side of the shorter and more obtuse median notch. The plates of the male are broad and attain the tip of the anal tube. Mr. Marlatt has published an excellent account of this insect in Insect Life, vol. 7, pp 8–14, with a very good figure giving details. He however represents the last ventral segment of the female as more deeply cleft than in any specimen I have seen. It is common throughout the eastern United States and southern Canada, and extends its range west through Colorado and Utah to California.

4. **Ceresa brevitylus** n. sp. Pl. 1, fig. 13.

Allied to *basalis* Walker. Male: Pronotum about as in *borealis* Fairm. a little higher than in *basalis*; smooth, the metopidium convex, its sides rising high above the head, divergent and nearly rectilinear to the short subacute suprahumeral horns which point outward and backward; surface evenly punctured with a strong median carina; semicircular impression deep; anterior margin deeply but regularly sinuated, not subangulate near the eyes as in the allied species; the callosities strongly distinguished. Head unusually large and smooth, very closely and evenly rastrate-punctate; anterior margin of the cheeks regularly convexly arcuated, almost attaining the apex of the tylus; the latter large, reaching about one half way to the base of the head; at apex scarcely longer than the cheeks and loræ, and, when viewed from before, truncated and obtusely and feebly emarginate. Last ventral segment very short; plates of the male broad, quite regularly narrowing to the obtuse apex which hardly attains the tip of the pygofers; their surface feebly convex, not at all carinate. Color fulvo-testaceous tinged with green in places, doubtless clear green in life, more or less strongly marked with black on the pectoral pieces and femora. Elytra subhyaline, faintly clouded toward their apex.

Described from two males taken at Jamesburgh, N. J. June 19th, and sent to me by Prof. J. B. Smith. From Prof. Sherman I have received a specimen that I believe to be the female of this species. It is larger with the slender apex of the pronotum longer and the suprahumeral horns longer, more acute and recurved. The last ventral segment has a shallow notch with the margins rounded and but little oblique on either side. The femora, coxæ and the pectoral surface about them are black; the trochanters, tibiæ and tarsi brown. In the Cornell University collection are two similar females from Georgia.

This species belongs to the group with short angular suprahumerals. In form it comes nearer to *basalis* but the pronotum is higher in front and more convexly arched above. The last ventral segment of the female has about the form found in *bubalus* but its notch is still more shallow. The apex of the tylus is armed with stiff blackish hairs but the surface of the pronotum is not hairy as in *basalis.*

5. **Ceresa taurina** Fitch. Pl. 1, fig. 19.

A somewhat smaller species than *bubalus* with more terete and very acute suprahumerals which slope upwards and are quite strongly curved backward especially in the females, and the metopidium is distinctly concave transversely. The last ventral segment of the female is much longer than in the foregoing species and has the outer hind angles rounded and much advanced beyond the last segment of the connexivum and the edges strongly oblique and a little arcuated to the acute median notch. I have taken *taurina* occasionally about Buffalo, in Welland Co., Ont., and at Fort Collins, Colorado; and have specimens taken by Mr. Palmer at Mt. Balsam, N. C.

6. **Ceresa Illinoiensis** Godg.

This species is known to me only through Goding's description. It seems to be very near to *constans* and *taurina.*

7. **Ceresa constans** Walker. Pl. 1, figs. 7,27.

In August 1907 I took a small series of this species on basswood trees growing among the hills south of Buffalo and have received others from Mr. Metcalfe beaten from basswood trees at Ottawa, Ont. Here the outer angles of the last ventral segment of the female are produced beyond the sixth segment of the connexivum in a rounded lobe, and the median sinus is broad and deep with a rounded apex and slightly arcuated sides. In this species the suprahumerals are long and acute, sloping a little upward and strongly recurved. The color shades to a clear yellowish brown dorsally becoming fuscous on the carinate edges.

8 **Ceresa Palmeri** VanDuzee. Pl. 1, fig, 33.

I have described this species in the Canadian Entomologist for May 1908 from material taken by Mr. W. J. Palmer of Buffalo in the region about Lake Temagami and Quinz Lake in northern Ontario. It is very close to *borealis* Fairm. as I now determine that species but is smaller and more slender and differs in having the humeral horns more terete and acute, the sinus of the last ventral segment of the female less abrupt and the sides more nearly rectilinear, the plates of the male narrower and more slender toward their apex where they are laterally compressed and the stiles distinctly shorter than the plates. Cornell University has an example of this species taken at Ithaca and Prof. J. B. Smith has sent me an example taken at Hebron, N. Y.

In July 1890 Mr. Palmer collected at Mt. Balsam, N. C., a *Ceresa* that is intermediate between this species and *borealis* as found in New York, Ohio, Kansas and Colorado. It is just possible that these three forms will eventually have to be united as varieties of one species but that cannot be done with the material now at hand.

9. **Ceresa borealis** Fairmaire. Pl. 1, figs. 8,32.

All writers since Fairmaire's time have placed this name as a synonym of *bubalus* but his description cannot be so construed as to fit any specimen of that species. It certainly refers to a smaller and darker species and must be applied either to this species or the paler specimens of *basalis* I prefer to apply it here and believe later investigations will uphold this decision. In this species, which is abundant throughout New York State and is found in Canada, Ohio, and Kansas, as represented in my collection, the outer angles, of the last ventral segment of the female are a little longer than the sixth segment of the connexivum and are rounded; the hind margin is slightly oblique and feebly rounded or truncated either side of the broad triangular median notch. Mr. Palmer took a series of males in North Carolina that differ only in being smaller with the suprahumerals more acute and recurved, thus forming a transition to *Palmeri.* The only female in the North Carolina lot differs from the form noted above in having the hind margin of the last ventral segment of the female broadly excavated with the sides oblique and sinuated. Other examples with about the same form of ventral segment I have taken at Hamburg, N. Y., and Ogden, Utah. I do not care to separate them without more material.

10. **Ceresa basalis** Walker. Pl. 1, fig. 34.

This species like the last is subject to much variation and is difficult to delimit. In the palest females the lower surface and disk of the femora above are black while in the darkest males the whole surface is deep shining black with the middle and edges of the face, tibiæ and tarsi, brown and the elytra smoky hyaline becoming black toward their base. In all the metopidium is transversely flat or nearly so, as in *borealis* and *bubalus*, but here the suprahumerals are triangular and horizontal, not distinctly elevated as in *borealis* like which species the surface is covered with short stiff hairs. In *basalis* the last ventral segment of the female is short, not surpassing the sixth connexival segment, with its hind margin broadly and deeply excavated almost from the lateral angles to the base, the sides of this sinus rectilinear or nearly so.

This species is very abundant throughout northern New York, New England and Canada, where it attains its deepest black color. Westward it occurs through Colorado and Saskatchewan to the Selkirk Mts. in British Columbia. Dr. Goding has redescribed the pale form as *Ceresa turbida* and Prof. Osborn an intermediate form as *Ceresa melanogaster* (Bul. Nat. Hist. Lab. Iowa State Museum, II, p. 390, 1803). *Stictocephala semi-brunnea* Buckton seems to be the same in so far as one can judge from his description or figure.

11. **Ceresa albidospara** Stal.

In the Cornell University collection are two males and four females taken at Palo Alto, California, in May 1892, that agree in every particular with Stal's short description. This species is very close to *borealis* Fairm. but the metopidium is flat or even a little convex between the suprahumerals, thus giving it somewhat the appearance of a small *bubalus*. The dorsal outline is also more like that of the *bubalus* being more arcuated with the attenuated apex more depressed than in *borealis*. The clypeus is more strongly produced than in that species and the vertex is very conspicuously striate. Here the apical sinus of the last ventral segment of the female has an abrupt and rounded apex and almost attains the base of the segment. In *borealis* this sinus is acutely pointed. In the males the disk of the sternum and the venter, excepting the genital pieces and the slender edges of the segments, are black. In the female this black color is sometimes barely indicated.

Dr. Ball has just sent me, among other interesting Membracids, a male of this species taken by Prof. Wickham at Carson City, Nevada, in which the suprahumerals are a little shorter than in those from California.

12. **Ceresa brevis** Walker. Pl. 1, figs. 35, 36.

In August 1888 I took at Gowanda, N. Y. two females that I identify as Walker's *brevis* but with some doubt. These are larger, have the pronotum more elevated and the suprahumerals shorter than they really should be to match with his description. The face is large, unusually smooth, with conspicuous vertical striæ between the ocelli and eyes. They are marked with black exactly as described by Walker but the pronotum is dotted with pale green on fulvous ground, a condition however often found in other species. Here the ultimate ventral segment of the female is short with a broad shallow sinus and short median notch about as in *bubalus*. Three males taken by me in Colorado I have doubtfully placed as the other sex of this species. They differ from the females described above in being smaller with the suprahumerals reduced to obtuse angular projections. The peculiar characters of the face, the elevated pronotum and the arrangement of the black color beneath are identical. Further material from both localities must be studied before their identity can be decided.

13. **Ceresa brevicornis** Fitch. Pl. 1, fig. 37.

In this species the suprahumerals are small and bluntly triangular as in *brevis* but the metopidium is broader, the pronotum is less elevated with a longer and thicker tip, the striæ are equally distinct across the whole base of the vertex and the lower surface and legs are without the black markings. Here the last ventral segment of the female is long, considerably exceeding the sixth segment of the connexivum, and the hind edge is oblique and subsinuated to the broad obtuse median notch. Of this species I have seen but a single specimen which was taken at New Haven, Conn., August 7th, 1905, by Prof. W. E. Britton.

14. **Ceresa femorata** Fairmaire, Pl. 1, fig. 38.

In this species as I identify it the pronotum is little elevated, the metopidium is low, its sides rise vertically for a short space and then abruptly diverge to the suprahumerals which form right angles with the latero-superior edges of the metopidium; the surface is hairy as in *basalis* and the face is short and roughly corrugated, showing scarcely a trace of the vertical striæ found in many of our species. The lower surface is black with the legs, hind edges of the apical ventral segments, oviduct and sides of the pygofers and connexivum fulvous. Ultimate ventral segment of the female short, broadly sinuately emarginate almost to its base. I have one example taken in Colorado.

15. **Ceresa uniformis** Fairmaire. Pl. 1, fig. 39.

Stal and all subsequent writers have placed this as a synonym of the foregoing but I have one example that corresponds exactly with Fairmaire's description but is quite distinct from the individual I place as *femorata*. Either I have wrongly identified one of both of these species or Fairmaire's two species are quite distinct. Judging from the material I have seen in this genus I prefer to adopt the latter alternative. This insect has the form of the preceding except that the metopidium is more elevated with the sides rectilinear to the small tubercular suprahumerals, which are minutely tipped with black. The face is rough as in the last species and the apical margin of the elytra is infuscated. I have a single male from Austin, Texas.

Genus Stictocephala Stal.

This genus may be distinguished from *Ceresa* by the absence of suprahumeral horns. This is a purely artificial character and the two genera run into one another by almost insensible gradations, the approach in our fauna being through *Ceresa femorata* and *Stictocephala festina* var. *angulata.* Canon Fowler in the Biologia does not trust to the form of the pronotum but claims to have found other characters in the form of the male genitalia that are sufficient. I have however been unable to detect any such characters as he mentions without dissection of the insect, which generally is out of the question, and prefer to distinguish the genus on the form of the pronotum which I consider amply sufficient. It has as good a standing on this character alone as has such genera as *Publilia*, *Glossonotus* and *Telamona.* All our described species are nearly or quite unicolorous green in life with pronotum closely punctured. The best characters with which to distinguish the species are found in the form of the pronotum, face and last ventral segment of the female. The following key may assist in placing our species:

Carinate sides of the metopidium meeting before the middle of the body, 1.

Carinate sides of the metopidium meeting at or behind the middle, 4.

1. Metopidium viewed from before obviously widened upward to the rounded suprahumeral angles; length 7½ to 8 mm. 2.

–. Metopidium not widened upward, frequently narrowed from the base, 3.

2. Loræ continuing the rounded contour of the cheeks, the clypeus scarcely longer; last ventral segment of female broadly subangularly excavated behind. Inhabits east of the continental divide, 1, *inermis* Fabr.

–. Loræ narrow, abruptly projecting beyond the nearly straight apical margin of the cheeks; clypeus much surpassing the loræ; margin of the last ventral segment of female oblique either side of the abrupt, deep median notch. Inhabits California, 2, *pacifica* VanD.

3. Metopidium convex, its sides vertical for a space, the carinate edges superiorly well arcuated; head rounded before, the clypeus scarcely exceeding the cheeks; length 7 mm. 4, *substriata* Walk.

–. Metopidium flat, conical in outline, the sides approaching almost from the base, median carina distinct; head short, the oblique sides much exceeded by the clypeus, 3 *Wickhami* VanD.

4. Metopidium viewed from before widened upward to the obtuse suprahumeral angles, 5.

–. Metopidium regularly narrowing above the humeri, 7.

5. Pronotum unusually depressed, the dorsum nearly straight; lateral carinæ meeting far behind the middle; metopidium low, its sides viewed from before well rounded, scarcely carinated; attenuated apex of the pronotum very slender and decurved, 7, *Gilletti* Godg.

–. Dorsum, viewed from the side, distinctly arcuated; metopidium higher, its sides angulated or subangulated, distinctly carinated, uniting somewhat behind the middle of the dorsum; face evenly and regularly punctured, 6.

6. Metopidium obviously angled either side, especially in the female; carinæ frequently rufous, 5, *festina* Say.

–. Metopidium narrower and higher, the sides rounded or feebly angled, 6, *rotundata* Stal.

7. Carinate sides of the metopidium meeting far behind the middle; pronotum low, the dorsum but feebly arcuated, 9, *franciscana* Stal.

–. Carinate sides of the metopidium meeting at or near the middle, 8.

8. Larger, 8mm., and depressed; almost concolorous; face roughly corrugated, scarcely punctured; clypeus and loræ prominent, strongly produced, 8, *collina* VanD.

–. Smaller, 6-6½mm., and more elevated; face smoother, evenly and closely punctured; clypeus and loræ little produced, 9.

9. Pectus and femora black; clypeus briefly but obviously produced beyond the line of the cheeks, 10, *lutea* Walk.

–. Pectus and femora concolorous or the latter but partly black; clypeus broadly rounded, continuing the contour of the cheeks, 11, *diminuta* VanD.

1. **Stictocephala inermis** Fabr. Pl. 1, figs. 9,17.

This, our largest *Stictocephala*, is widely distributed in the United States east of the continental divide in Colorado. The face is large and smooth with the surface finely and closely punctured and striate between the ocelli and the eyes; clypeus and loræ short and rounded at apex and very nearly continuing the arcuated outline of the cheeks; femora generally black above in eastern specimens but this color is sometimes entirely absent. The last ventral segment of the female is broadly, angularly, but not deeply excavated behind. Length varying from 6½ to 9 mm. This was redescribed as *Membracis goniphora* by Say.

2. **Stictocephala pacifica** n. sp. Pl. 1, figs 23,30.

Allied to *inermis* but quite distinct in the form of the face and last ventral segment of the female. Pronotum less elevated; metopidium proportionately broader; a little convex transversely, its median carina distinct but not prominent; lateral carinate edges diverging to the broadly rounded suprahumeral angles, thence running almost straight and meeting well before the middle; subulate apex as in *inermis*. Face scarcely punctured; strongly striate across the whole base, its apex roughly corrugated; anterior margins of the cheeks reflexed; tylus large, extending for half its length beyond the cheeks; Last ventral segment of the female long; its margin oblique either side of the abrupt median notch which is rounded at apex and attains two thirds the length of the segment. Color probably green in life, yellowish and mottled in the dead specimen, with scattering pale points; carinæ pale; between the humaral angles and anterior carina is a distinct fuscous or ferruginous cloud; elytra hyaline, a little clouded at apex; nervures of the wings blackish, conspicuous through the the closed elytra; disk of the pectus black, the femora and venter a little embrowned. Length 8mm.

Described from one female example taken at Palo Alto, California, and now in the Cornel University collection.

3. **Stictocephala Wickhami** n. sp. Pl. 1, figs. 10,16.

Aspect of *inermis* but slightly smaller. Metopidium flat, high, and almost entirely vertical, only its apex recurved; sides straight for a space, then curving elliptically to the apex. Pronotum not greatly elevated; dorsal line rectilinear almost to the acute tip which scarcely surpasses the abdomen. Head short, roughly sculptured, but showing a few coarse longitudinal striæ on either side at base. Last ventral segment of the female long, distinctly exceeding the apex of the last connexival segment, deeply and obtusely emarginate almost to its base, the sides of the sinus sinuated; plates of the male broad, convex, and polished, and a little exceeding the pygofers. Length 7–8mm.

Color pale yellowish green in the dead specimen, more yellowish on the head and abdomen; Middle of the pectus and a cloud on the base of the venter black in the female. In the male the black covers the whole disk of the venter excepting only the narrow edges of the segments.

Described from one pair taken by Prof. H. F. Wickham in California: the male at Truckee, 5800 feet altitude; the female at Salton, 225 feet altitude, both in August. In the Cornell University collection is a female taken at Olympia, Wash., by Mr. T. Kincaid. This very distinct species may at once be distinguished by the vertical metopidium, the sides of which meet almost over the humeri, and the low, horizontal and rectilinear dorsum.

4. **Stictocephala substriata** Walker. Pl. 1, fig. 20.

Most nearly allied to the preceding but sufficiently distinct. Metopidium convex, recurved for a greater space at apex and meeting distinctly behind the humeri but much farther front than in *inermis*. Pronotum low, the dorsum nearly rectilinear but sloping posteriorly to the short acute apex which scarcely attains the tip of the abdomen; face large, coarsely and evenly punctured, with almost obsolete striæ on either side of the base; the clypeus scarcely longer than the arcuated cheeks. Last ventral segment of the female short, almost truncated behind, with a small acute median notch. In this species there is a black patch adjoining each coxa and the outer disk of the femora is also black. Length 7mm. I have but little doubt but this is the insect described by Walker as *Thelia substriata*. His type was from Florida and I have received it from the same state and from New Jersey, North Carolina and Georgia.

5. **Stictocephala festina** Say. Pl. 1, fig. 28.

This species, as I identify it, has about the size and form of *lutea* but may be distinguished by its having the metopidium more or less angled either side. Three forms occur in our territory that I cannot distinguish as distinct species. That most generally received from correspondents has the metopidium slightly and very obtusely angled in the males, more strongly angled in the females, its surface transversely strongly convex, its lateral carinæ distinct anteriorly, meeting considerably behind the middle of the dorsum before which they become obtusely rounded off; acuminate apex of the pronotum decurved in conformity with the dorsal contour and a little surpassing the tip of the abdomen. Face flat, closely and evenly punctured including the base of the tylus, the longitudinal striæ on the base of the vertex scarcely indicated. Elytra hyaline with the nervures moderately distinct. Last ventral segment of the female deeply triangularly notched, its outer angles truncated.

This species is concolorous so far as I can make out from the dried specimens except that in some examples the dorsal carinæ are more or less tinged with rufous. I have seen this form from Alabama, Mississippi, and Arizona and Dr. Ball has two examples from the island of Hayti. It would not be surprising if *Stictocephala dubia* Fowler (Biologia p. 109.) should prove to be this species or its variety *rufivitta* Walker.

Stictocephala festina var. **rufivitta** Walk.

This variety as I locate it is a little smaller and more slender than *festina*, and the dorsal carinæ are not evanescent before their point of meeting the posterior carina and are more deeply tinged with rufous. I have seen but one individual with the black venter as described by Walker and in this the carinæ are scarcely touched with rufous. Of this variety I have seen only males. They are from Louisiana, Georgia and Florida

Stictocephala festina var. **angulata** n. var.

This differs from the typical *festina* in being a little broader with the metopidium more strongly angled either side forming there nearly a right angle. It is perhaps a little more coarsely punctured and the notch in the last ventral segment of the female is shorter and less angled. Of this form I have seen only females. They were from Arizona and Texas. This would appear to be the extreme form of the female as does *rufivitta* of the male. Both grade insensibly into the typical *festina*.

6. **Stictocephala rotundata** Stal. Pl. 1, fig. 15.

This species I have seen only from Cuba. It is very close to *festina* but the pronotum is a little more elevated with a higher and narrower metopidium the sides of which are quite regularly rounded. The last ventral segment of the female is broadly angularly excavated to the lateral angles. The head is closely and evenly punctured as in *festina*. I include this species as it is not unlikely it will yet be found in southern Florida.

From Mrs. Slosson I have received a female taken at Lake Worth, Florida, that differs from *rotundata* only in having the sides of the metopidium more strongly carinated and the pronotum a little lower with its apex much longer and more slender and curved downwards until it touches the apex of the pygofers. The last ventral segment is less broadly excavated with the sides of the sinus less oblique leaving a rounded lobe at either outer angle. It came labelled "*subulata* Say" but it wants the "two obsolete, whitish, impunctured lines" on either side, and the, attenuated tip reaches well toward the apex of the three apical areoles of the elytra. The true *subulata* Say has not since been recognized so far as I know, and I quite agree with Dr. Uhler in thinking that it probably represents a species of *Cyrtolobus.*

7. **Stictocephala Gilletti** Goding. Pl. 1, fig. 24.

This distinct species is still more depressed than *festina* and *rotundata.* The metopidium is low, strongly convex, with the sides rounding anteriorly from the base and then running back to unite much behind the middle. Apex of the pronotum long and slender, curved downward and almost reaching the tip of the elytral areoles. Head bluntly triangular, its sides rectilinear, the broad clypeus almost continuing the contour of the cheeks; surface even, coarsely and closely punctured, without striæ. Last ventral segment of the female broadly and deeply emarginate, the sides of the sinus feebly arcuated. Plates of the male very short and broad, rounded at apex, scarcely longer than broad, equalling the pygofers. Length 7mm. My four examples are concolorous. Two of these I took at Grand Junction, Colorado, and two were taken by Prof. H. F. Wickham at St. George, Utah, all in August. I cannot satisfactorily distinguish this species from *elongata* Fowler but would not care to place that as a synonym without having seen Mexican material.

8. **Stictocephala collina** n. sp. Pl. 1, figs. 11,22.

General aspect of *Gilletti* but larger and less depressed, with the dorsum more arcuated, the attenuated apex shorter and the metopidium higher and narrowing from its base. Sides of the metopidium superiorly obtusely rounded, scarcely carinated, meeting at about the middle; attenuated apex but little surpassing the tip of the abdomen. Face impunctate or nearly so, roughly sculptured, with irregular smooth areas; clypeus and loræ strongly differentiated and well produced beyond the line of cheeks. Pronotum closely and strongly punctured; the dorsum almost rectilinear nearly to the tip of the attenuated apex; the latter sometimes a little more strongly decurved. Elytra hyaline, rarely a little suffused at apex, nervures distinct. Last ventral segment of the female deeply excavated, the oblique sides of the sinus a little arcuated. Color apparently concolorous green becoming yellowish in drying, extreme tip of pronotum and oviduct of the female blackish. Eyes banded, ocelli rufous. Length 8mm.

Described from 12 specimens taken on the foothills about Ft. Collins, and Boulder Colorado. I have not yet heard of this species having been taken west of the continental divide. Heretofore it has been confounded with *Gilletti* which however is a very distinct species. I have formerly determined this form as the *Stictocephala franciscana* of Stal and it does agree reasonably well with his very short description but by his synoptical table of the species of *Stictocephala* published in 1869 his species must have a metopidium narrowing from its base which this does not. In that table he has wrongly identified Say's *festina*.

9. **Stictocephala franciscana** Stal. Pl. 1, figs. 25,29.

After a careful study of Stal's description and synoptical table published in 1869 I have been led to place his name *franciscana* on the present west-coast form although such determination is at best but tentative. This species most closely resembles *Gilletti* but the pronotum is still lower, the sides of the metopidium do not diverge upward to a lateral suprahumeral angle but are about vertical for a space and then converge to meet behind the middle. The metopidium is very low being rounded back almost from the base, the lateral carinæ are obtusely rounded off, the attenuated apex is slender and acute, but little decurved in the female, and slightly surpasses the abdomen; the face is unusually large with its surface closely punctured and the median line at base and an area about each ocellus is depressed. Clypeus and loræ broad, considerably produced but depressed beyond the line of the cheeks; lateral impressed crescentic line on the sides of the pronotum distinct. Last ventral segment of the female long, deeply and acutely emarginate. Color brownish testaceous clouded with darker but this peculiar color is very likely due, in part at least, to immaturity.

These notes are taken from a specimen from Lancaster, California, in the collection of Prof. E. D. Ball. and another that certainly pertains to the same species, in the collection of Cornell University, was taken at Seattle, Washington.

Dr. Ball possesses another specimen taken by Prof. Wickham at Independence, California, which is still more depressed with the carinæ yet more rounded off and the whole surface is more coarsely punctured. Here the hind edge of the last ventral segment of the female is truncated with a broad ovate triangular median notch and the attenuated apex of the pronotum is strongly decurved. It has the same testaceous-brown color but the abdomen and pectus in part are black. A male of this form is in the Cornell University collection which was taken at Riverside, California. These two may represent a distinct species but my material is too meagre to warrant description.

10. **Stictocephala lutea** Walker, Pl. 1, figs. 14, 31.

This is the common smaller form that seems to be abundant throughout the eastern states from Georgia to Canada. It may be distinguished by the convex metopidium which terminates a little behind the middle of the high well arcuated dorsum, and by the black pectus and femora. The edges of the metopidium are rounded and scarcely carinated and the short acute tip of the pronotum just about reaches the apex of the abdomen. Last ventral segment of the female rather long; its hind edge broadly and slightly emarginate, with the median notch extremely minute or wanting, and the edges either side moderately oblique and nearly rectilinear. The male plates are broad and short, triangular-conical, equalling the pygofers.

11. **Stictocephala diminuta** n. sp. Pl. 1, fig. 21.

Aspect of *rotundata* Stal but more closely allied to *lutea* Walker. Head short, broadly rounded before, the clypeus very broad and with the loræ continuing the contour of the cheeks; surface little roughened, closely and evenly punctured. Metopidium conical, convex, the sides converging almost from the base and meeting but little behind the middle; anterior margin strongly sinuated. Pronotum moderately elevated, its short and very acute apex scarcely attaining the apex of the abdomen. Last ventral segment of the female long, almost truncated behind, the hind edge scarcely oblique either side of the very narrow and deep median notch which reaches almost to the middle of the segment. Color of the specimens pale greenish with obscure mottlings; the face, front of the metopidium and attenuated tip tinged with rufo-fulvous; femora obviously infuscated. Length 6mm.

Described from two female examples received from Mrs. Annie Trumbull Slosson: one taken at Charlotte Harbor and the other at Biscayne Bay, Florida. This species would be most likely to be confounded with the Cuban *rotundata* with which it agrees in the form of the clypeus, but it has the pronotum more elevated with the attenuated apex shorter; the metopidium is less convex, with its sides converging from the base and meeting much nearer the front. From *lutea* it differs by its smaller size, the absence of black from the lower surface, the more strongly carinated sides of the metopidium and much shorter clypeus. In the form of the last ventral segment of the female it is quite distinct from either.

12. **Stictocephala sanguino=apicalis** Goding.

Dr. Goding described this species as near *inermis* but with the posterior process of the pronotum sanguinous behind the middle and marked with two transverse brown bands. These markings if not due to an accident or immaturity are quite unique in this genus.

?Stictocephala subulata Say.

Generally listed as a *Stictocephala* but Dr. Goding states on the authority of Dr. Uhler that Say's species is but a variety of *Atymna inornata*. It certainly fits better in *Cyrtolobus* or *Atymna* than in *Stictocephala*.

Genus Acutalis Fairmaire.

In this genus are now placed only the larger species formerly included in it. In these the elytral nervures are distinct and there are five apical and no discoidal areoles. Our three species may be distinguished as follows:

Elytra black and opaque, the apical areoles only hyaline, the dividing nervures heavy and black; head and pronotum mostly deep black, 1, *tartarea* Say.

Elytra hyaline, nervures concolorous or partly black, 1.

1. Uniformly pale greenish; elytral nervures concolorous, 3. *inornata* Ball.

–. More or less broadly marked with black above; elytral nervures discolored or black, 2, *semicrema* Say.

1. **Acutalis tartarea** Say.

This is an intensely black species with the humeral margins, eyes, ocelli, and most of the lower surface pale; The apical areoles are abruptly hyaline with heavy black dividing nervures, the costal at apex pale. It seems to be common throughout the middle Atlantic states and extends northward through New York to Canada.

2. **Acutalis semicrema** Say.

The males of this species, so far as my observations extend, are deep black above with a median transverse band on the face and a broad submarginal lateral vitta on the pronotum, pale. Elytral nervures heavy, black, excepting the costal at apex and that defining the inner or posterior side of the large terminal areole, Lower surface and legs pale. In the female the pronotum is pale with a large black dorsal spot which rests on the anterior margin and extends for at least half its length behind the humeri. The elytral nervures are more or less discolored or in part black. I have seen examples of this species that were taken at localities from southern New York to Florida. They are doubtless variable in the extent of the pale markings, and those from the south seem to have heavier elytral nervures than do those from the north. Fairmaire described this species as *Acutalis anticonigra.*

3. **Acutalis inornata** Ball.

This species was described by Dr. Ball in 1905. Ordinarily it is of a uniform bright green color in life turning to dull yellowish green in the dried specimen, but Mrs. Slosson has recently sent me an example taken at Belleair, Florida, which is marked with three brown spots or clouds on the front of the pronotum, one above each eye and a smaller one on the summit of the dorsum; the base of the metopidium has a transverse green band and the head is black with a transverse greenish band below the ocelli that is extended upward along the inner margin of the eyes; the costal nervure is also black. This would indicate a transition toward *semicrema*, but judging from the material I have seen it may be sufficiently distinguished by its smaller size, more polished surface and the shorter and less decurved posterior process of the pronotum.

Genus Micrutalis Fowler.

If we admit this genus as distinct from the foregoing we must distinguish it by the four apical areoles in place of five and the very obscure venation of the elytra, and so distinguished it must embrace our large northern *Acutalis dorsalis* Fitch, as well as the smaller southern and western forms allied to *calva*. *Dorsalis* is intermediate between these genera not only in its large size but in the fact that the outer apical areole, which in this genus is formed by the coalescence of the two areoles between the terminal and costal, has at times a minute fifth areole at the apex of the costal. This indicates that this large areole is not formed by the atrophy of the nervure normally dividing the two areoles found there in *Acutalis* but by the crowding of this nervure against that forming the apex of the costal areole. In the smaller and more typical species of this genus the stylated terminal areole is very small and at times entirely wanting; leaving then but three apical areoles. Our described species may be placed as follows:

Size large, 4–5 mm.; dorsum usually with a brown or black discal spot, 1, *dorsalis* Fitch.

Size small, less than 4 mm., 1.

1. Minute, 2½ mm.; head yellow with base and apex black; inhabits Arizona, 6, *parva* Godg.

–. A little larger, 3–4mm., 2.

2. Pacific coast species with the apex of the pronotum more obtuse; length 3 mm., 3.

–. Eastern species with the apex of the pronotum more slender and acute; length 3½–4 mm., 4.

3. Pale, the dorsum sometimes marked with a brown median line which may be expanded between the humeri and before the apex, 4, *occidentalis* Godg.

–. Above black with the apex of the head, basal line of the pronotum, two oval spots above this, the lateral margins and tip pale; pectus and abdomen in part black, 5, *binotata* Godg.

4. Pale; pectus, basal margins of the head and pronotum, and median dorsal line expanded posteriorly, black, 3, *illinoiensis* Godg.

–. Black markings much more extended, the pronotum usually entirely black except at tip; in pale specimens the black on the dorsum is gathered anteriorly and does not form a dorsal line widened before the apex, 2, *calva* Say.

1. **Micrutalis dorsalis** Fitch.

Size and appearance of *Acutalis* but with the elytral nervures indistinct and with but four apical areoles. This insect is not uncommon in the northern states and Canada upon wild clematis.

2. **Micrutalis calva** Say.

Redescribed as *Smilia flavipennis* by Germar. This species is widely distributed from southern New York to Florida and west to the Rocky Mts. It shows great variation in the extent of its black markings. I have seen specimens entirely pale above with the pectus and femora slightly invaded with black. Generally the pronotum excepting its tip and humeral angles, the base of the head, all the pectus and the femora are deep black.

3. **Micrutalis illinoiensis** Goding.

I believe this is a mere color variety of *calva*. I took two examples at Milan, Ohio, that have the black dorsal line and subapical spot as described by Dr. Goding and otherwise agree with his description in every particular.

4. **Micrutalis occidentalis** Goding.

This is a pale species marked much as in *illinoiensis* but the dark markings are paler and more diffuse. Some specimens are entirely pale with a ferruginous line on the base of the vertex and a sinuated subapical one on the anterior margin of the pronotum. The Cornell University collection possesses three examples taken at Riverside, California, in June. This and the next are smaller and have the apex of the pronotum distinctly shorter and more obtuse than we find in the related eastern *calva* and *illinoiensis*.

5. **Micrutalis binotata** Goding.

Here the pectus in part, the base of the head, and the pronotum are black; the latter has a basal transverse vitta, two oblique oval spots above them, sometimes much reduced, the humeri and apex, and in some examples the lateral margins and connecting lateral spot behind the middle, pale. I have seen but two typical examples of this, both females taken near Los Angeles, California, by Mr. D. W. Coquillett. The Cornell University collection has one smaller specimen which wants the pale lateral margins and spots but it is a male and is perhaps typical for that sex. This may be but a color variety of *occidentalis*,

6. **Micrutalis parva** Goding.

Thus far known from Arizona. This has the head and upper surface black, with a broad transverse band across the middle of the face and the tip of the pronotum pale. Its small size and depressed form will distinguish it.

Tribe Telamonini Goding.

Pronotum unarmed, 1.

Pronotum armed with a horn or dorsal crest, more or less developed, 2.

1. Dorsum rounded, not at all compressed, 1, *Carynota* Fitch.

–. Dorsum strongly compressed, foliaceous, 7, *Archasia* Stal.

2. Pronotum armed anteriorly with a porrect horn, terete or nearly so, 2, *Thelia* A. & S.

–. Pronotum armed with a laterally compressed horn which is erect or nearly so, or with a dorsal crest more or less elevated, 3.

3. Dorsal crest arising from between the humeri, in the form of a compressed linear horn, erect or slightly inclined forward, 3, *Glossonotus* Butler.

–. Dorsal crest arising from behind the humeral angles, if distinctly elevated wider than high, 4.

4. Corium coriaceous and punctured from the base to the apex of the costal areole, 6, *Telamonanthe* Baker.

–. Corium coriaceous and punctured if at all only for a short space at base, 5.

5 Dorsal crest step-shaped at apex, the anterior foliole abruptly elevated above the posterior and frequently inclined forward, 4, *Heliria* Stal.

–. Dorsal crest rounded, obtusely pointed, truncated or sinuated at apex, sometimes scarcely elevated, 5, *Telamona* Fitch.

Genus Carynota Fitch.

This genus may be distinguished from *Ophiderma* primarily by the oblong, non-stylated terminal areole of the wing and also by its having the dorsum longitudinally arcuated with more or less of a sinus posteriorly, at least in the more typical species. In *porphyrea* and its allies there is a distinct impression on either side behind the humeral angles and in this respect they approach *Cyrtolobus* in that group of species I have called *Xantholobus*. *Carynota muskokensis* is a more depressed species and approaches *Ophiderma*. As pointed out by me in 1890, (Psyche V. p. 391), Dr. Stal was mistaken in placing this genus as a synonym of *Ophiderma*. I would however consider it identical with *Optilete* Stal, the type of which, *porphyrea*, is I believe congeneric with *mera* the type of *Carynota*. Our species may be located by the following key:

Ground color testaceous grey; apex of the pronotum and a transverse band behind the middle brown. 1, *mera* Say.

Ground color rufous to dark chestnut brown, 1.

1. Dorsal line of the pronotum regularly but feebly arcuated for its whole length; color dark chestnut brown, obscurely and irregularly dotted with yellowish with a somewhat larger triangular spot on the middle of the lateral margins; lateral compression very slight, 2, *muskokensis* Godg.

–. Dorsal contour strongly sinuated posteriorly where a transverse angular band crosses the pronotum; lateral compression distinct, 2.

2. Front of pronotum with a triangular group of pale points and a similar group is on either side behind the humeral angle; pronotum shorter and more convex, 4, *porphyrea* Fairm

–. Front of pronotum with an irregular group of pale points; this is extended along the dorsum and is connected with a transverse band of similar points which crosses the back before the middle, 3, *marmorata* Say.

1. **Carynota mera** Say.

The type of the genus. This common and widely distributed species cannot be confounded with any other known to me. The male has been redescribed by Dr. Goding as *Carynota Strombergi.* It is much smaller than the female and wants the dorsal sinuation before the apex. Emmons figures the female as *Gargara majus.*

2. **Carynota muskokensis** Goding. Pl. 2, fig. 26.

This species I have seen only from Canada and northern New England. It is a regularly oval species of a bright chestnut brown color on which the pale markings are inconspicuous. Provancher has described it as *Ophiderma marmorata.* Prof. Barlow has taken at Waltham, Mass., what may be a small and immature male of this species but more material is needed before it can be placed with certainty.

3. **Carynota marmorata** Say.

In the material I have seen under this name there appears to be two fairly distinct species. The form that I determine as *marmorata* is longer and more slender with the apical sinuation less pronounced. The color is a lighter or rufous brown with the pale markings forming an angulated transverse band crossing the highest point of the dorsum where it connects with the irregular area of pale irrorations of the metopidium. Here the male plates form a broad almost equilateral triangle with its apex moderately produced and armed with the usual bristles. This form agrees most closely with Say's description of his *marmorata* and I consider it the typical form of the species, Prof. Franklin Sherman Jr. has sent me both sexes from North Carolina and I have received a pale specimen from Mr. J. D. Evans that was taken at Sudbury, Ontario, This I believe is Provancher's *Carynota picta*.

4. **Carynota porphyrea** Fairmaire. Pl. 2, fig. 27.

This differs from the preceding in being shorter, in having the dorsum more elevated with a stronger impression on each side, the apex much shorter and more abrupt, and the pale markings reduced to an oval patch either side on the margins behind the humeral angles, and an irregular area on the metopidium. Here the elytra are a deeper brown and the plates of the male are short, broad at the base, with the sides very oblique on the basal half then subparallel to the rounded apex. In both this species and *marmorata* there is a transverse lozenge shaped pale mark near the apex of the pronotum which touches the sides and has a central spot of the ground color on the dorsal carina.

This form agrees very closely with Fairmaire's description of *porphyrea* and I feel little doubt about the determination. Whether this should be considered as distinct from *marmorata* is somewhat questionable but there can be no harm in listing them as distinct until fuller observations establish their relative position. This is the type of Stal's genus *Optilete*.

Genus Thelia A. & S.

The males of our two species may be separated as follows:

Pronotal horn long and thick, projecting almost horizontally forwards, surface of the pronotum hairy, closely punctured, without longitudinal rugæ, 2, *Uhleri* Stal.

Pronotal horn shorter and more slender, directed upward and forward at an angle of 34 to 40 degrees; surface of the pronotum not obviously hairy, more coarsely punctured with seven or eight longitudinal rugæ, 1, *bimaculata* Fabr.

1. **Thelia bimaculata** Fabricius.

This is the type of Amyot and Serville's genus. The males have a conspicuous broad yellow vitta on either side. The females have the yellow vitta replaced by a greyish patch more or less conspicuous and the pronotal horn is longer and more erect. This species lives on locust and is common and widely distributed in the eastern United States.

2. **Thelia Uhleri** Stal. Pl. 2, fig. 1.

Apparently rare. I have taken it about Buffalo and in Kansas and have seen others from Canada. I have seen only males in which sex the color is of a uniform rich rufo-piceous.

Genus Glossonotus Butler.

This genus was founded by A. G. Butler in 1877 (Cistula Entomologica, II. p. 222) for *Membracis acuminata* Fabr. and its allies in which the dorsal pronotal process is tongue-shaped, nearly or quite erect, and placed well forward. Our described species may be distinguished by the following key:

Dorsum with a conspicuous lenticular white vitta behind the crest, 1.

Dorsum without such white vitta, 2.

1. Dorsal crest more slender, inclining distinctly forward; color a uniform griseous shading to brown along the borders of the pale dorsal vitta; elytra with a fuscous vitta at apex, 3, *univittatus* Harris,

–. Dorsal crest broader, especially in the female, nearly vertical; color more yellowish grey, the dorsal horn abruptly reddish brown; apex of the elytra with a piceous cloud which is not produced forward in a vitta, 4, *Godingi* VanD.

2. Brown with a large angular whitish spot on either side behind the humeri connecting with the pale metopidium and with a pale band before the apex, 5, *cratægi* Fitch.

–. Color a nearly uniform fuscous brown, 3.

3. Humeral angles prominent, acutely triangular; dorsal crest sinuated anteriorly; pronotum with longitudinal rugæ posteriorly: length about 10mm. 1, *acuminatus* Fabr.

–. Humeral angles shorter, obtuse; dorsal crest vertical and rectilinear anteriorly; pronotum without distinct longitudinal rugæ posteriorly; length ubout 7mm, 2, *turriculatus* Emm.

1 **Glossonotus acuminatus** Fabricius.

This, the type species, does not seem to be common. I have taken it about Buffalo and in southern Ontario and Kansas and have occasionally received it from correspondents in the eastern United States.

In some individuals the dorsal crest is strongly inclined forward in others it is erect and distinctly sinuated both before and behind, but with the limited material at my disposal it has been impossible to separate these as distinct species. Mr. W. T. Davis has sent me a fine large female from Lakehurst, N. J., in which the height to the top of the erect crest is equal to the greatest length of the insect. In all the specimens I have seen the crest is darker than the base of the pronotum and shows a marginal row of obsolete paler points.

2. **Glossonotus turriculatus** Emmons.

The only specimen I have seen of this species was taken by Mr. W. T. Davis on Staten Island. It is smaller than *acuminatus* to which it is most closely related, and differs in having the crest more slender and rising vertical from the very front of the pronotum, it is also smaller and the pronotum is without the longitudinal rugæ posteriorly. There will be no difficulty in recognizing it from Emmons' figure.

3. **Glossonotus univittatus** Harris.

Found sparingly throughout the eastern United States and Canada.

4. **Glossonotus Godingi** VanDuzee. Pl. 2. fig. 2.

Intermediate in character between *univittatus* and *cratægi*. In Ent. News (vi, p. 203, June 1895,) I have given the characters separating these three forms. *Godingi* is our most abundant and widely distributed species, occurring from Quebec to Colorado.

5. **Glossonotus cratægi** Fitch.

Not at all common but widely distributed in the eastern United States. It has the pale marks of the pronotum more strongly contrasted than in *Godingi* to which it is most closely related. Here the fuscous spot at the apex of the elytra is dark and elongated more as in *univittatus* but it is subtriangular in form rather than ligulate.

Genus Heliria Stal.

This genus is intermediate between *Glossonotus* and *Telamona.* It has a broader crest than the former with the anterior one half abruptly elevated above the posterior. After a careful study of all the forms accessible to me I have decided to exclude from this genus the intermediate forms in which the dorsal crest shows merely an angle on its posterior declivity, indicating the elevation of the anterior foliole and the almost complete elimination of the posterior. Hardly one step farther would take us to *Telamona pyramidata*, a species distinctly intermediate between *Telamona* and *Glossonotus.* I have therefore placed them in *Telamona* reserving *Heliria* for those species in which the crest has the peculiar step-like form described by Stal.

I have found it impossible to correlate Goding's description of *Heliria Strombergi* with his reference to a figure given by Walker in his British Museum Catalogue, and have thought it best to pass this species as unknown as I have had to do in the case of *Heliria anoflava* Buckton. The latter species probably does not pertain to this genus and may not inhabit North America at all. It is doubtful if it can be recognized when rediscovered. Our two species may be distinguished as follows:

Larger, 12–13mm., grey or brownish grey; posterior foliole of the crest little elevated above the dorsal line anteriorly, its hind angle subacute; humeral angles greatly produced, 1, *cristata* Fairm.

Smaller, 8mm , darker brown; posterior foliole of the crest, when well differentiated, elevated for at least its own width above the dorsal line, 2, *scalaris* Fairm.

1. **Heliria cristata** Fairmaire.

This large striking species, the type of its genus, has been taken by Mr. W. T. Davis at Lakehurst, N. J., and the Cornell University collection has an example from North Carolina. These are the only specimens I have yet seen. It is the *Telamona acclivata* of Emmons.

2. **Heliria scalaris** Fairmaire.

Here the anterior foliole of the crest is abruptly elevated to about twice the height of the posterior and is distinctly inclined forward as in *cristata*. While in Colorado I took two examples that I cannot separate specifically from *scalaris*. They have the anterior foliole vertical, rounded, and but little elevated above the posterior to which it slopes at an easy angle. The color is more grey with a broad brown vitta on either side which covers the crest. The typical form was taken by Dr. Fitch on the beech and described by him as *Telamona fagi*. I have taken the males on thorn bushes but there were beech trees near by from which they may have flown. It seems to be a rare form.

Genus Telamona Fitch.

The insects of this genus are rather above medium size with a remarkable development of the pronotum which makes them interesting objects of study and as a consequence a large number of species have been described. My material in this genus is not extensive and it is sometimes difficult to say what characters should be considered as of specific value. I therefore have not attempted to make a critical study of the synonomy, contenting myself with placing a few synonyms of which I feel reasonably certain. The synoptical table given below is founded mostly on the form of the pronotum and other superficial characters and with the notes and descriptions following refer only to the species known to me. But as they include most of those more commonly met with it is hoped that they may be of some assistance in the determination of these species and in connecting them with the synonomy used in the appended list. A more careful study of the genus is needed and I understand is soon to be undertaken.

Crest vertical, rather slender and narrowed upward, 1.

Crest if vertical broader, but little narrowed above, 2.

1. Crest much higher anteriorly, dorsal margin sloping, broken at the hind angle; front nearly vertical,
1, *declivata* V. D.

–. Crest narrowing above to a rounded point, hind angle scarcely if at all indicated, its front sloping from the metopidium without a sinus at the anterior base, 2, *pyramidata* Uhl

2. Anterior margin of the crest sloping to the front of the metopidium, without an obvious sinus at its anterior base, 3.

–. Crest nearly vertical before or sometimes overhanging, 9.

3. Crest if elevated more or less rounded or pointed at apex, 4.

–. Crest elevated, square or nearly so at apex but appearing tilted backward by the long slope of the anterior margin, 7.

4. Crest more or less conical, rounded or pointed at apex, 5.

–. Crest scarcely elevated, very broad, straight or very feebly rounded above, 6.

5. Crest about as high as its breadth at base, rounded at apex, posterior sinus of crest with a lenticular pale vitta, 3, *barbata* V. D.

–. Crest a mere obtusely conical hump, broadly rounded or very slightly angled above, 4, *viridia* Ball

6. Crest obviously raised, rectilinear and horizontal above, right angled behind; color pale yellowish or whitish, figured with darker, 6, *Westcotti* Godg.

–. Crest broadly rounded above, scarcely raised above the pronotum; color grey, marbled with darker, 5, *obsoleta* Ball.

7. Color greenish grey, irrorated with paler, with a pale vitta on the posterior margin of the crest, 9, *querci* Fh.

–. Color yellowish or greenish testaceous, marked with a brown vitta, 8.

8. Crest strongly sloping before, its apex usually rounded; scarcely longer than high, 7, *reclivata* Fh.

–. Crest lower, its width twice its height, nearly rectilinear above with the anterior angle rounded, humeral angles more acute, ?, *compacta* Ball.

9. Grey or brownish species, more or less distinctly banded or dotted with darker brown, sometimes almost entirely fuscous or blackish, 10.

–. Green or greenish species varying to clear yellow, sometimes banded with brown, 14.

10. Crest much higher before than behind but not forming a regular step as in *Heliria*, 11.

– Crest truncated above, the angles nearly or quite right angles, 13.

11. Anterior foliole greatly developed and in the female leaning over the head, apex rounded, superior margin arcuated, the hind angle scarcely forming a break in the contour, 14, *cucullata* V. D.

–. Anterior foliole not leaning over the head, 12.

12. Crest short, rising abruptly from the middle of the dorsum, nearly square, sloping superiorly, with the hind angle acute and prominent; inhabits Arizona etc. 13, *sinuata* Fowl.

–. Crest broader and higher, regularly rounding above, with the hind angle abrupt and acute; pronotum distinctly banded, 12, *concava* Fh.

13 A brown vitta down the anterior margin of the crest to the humeral angle and a broader one on the posterior margin, the latter strongly angled at the base of the crest; sometimes the whole surface brown dotted with paler, 11, *coryli* Fh.

–. A brown vitta on each side of the pronotum which becomes horizontal above and covers the entire crest, below this is a pale line which crosses the anterior base of the crest; superior edge of the crest with a small pale spot; in the darker specimens the form of this dark vitta can be detected, 10, *ampelopsidis* Harr.

14. Color yellow, more or less distinctly banded with brown, 15.

–. Color green or greenish, immaculate, 16.

15. Humeral angles greatly produced, more than twice the length of the eye; margin of the pronotum posteriorly and the elytra beneath with a fuscous spot, 18, *maculata* V. D.

–. Humeral angles not produced for more than the length of the eye; pronotum strongly banded but without the black spot, 15, *unicolor* Fh. *male.*

16. Crest with an obvious sinus at its anterior base; posterior sinus without a pale vitta, 15, *unicolor* Fh. *female.*

–. Crest vertical or a little overhanging before, without a distinct sinus at its anterior base; posterior sinus with a white vitta, 16, *extrema* Ball.

1. **Telamona declivata** n. sp.

Intermediate between *Glossonotus*, *Heliria* and *Telamona*. Pronotum low, slender; crest placed behind the humeri, narrow, nearly vertical before, anterior angle rounded, superior margin sloping backward rather steeply, the hind angle forming a decided break, sometimes a small step, at about the middle of its posterior declivity; posterior process long and slender, its acute apex a little exceeding the tip of the elytra. Pronotum coarsely punctured with moderately distinct rugæ posteriorly. Color dull yellowish brown with a dark nearly vertical vitta from the middle of the lateral margin, widening upward and covering the entire crest and spreading faintly down over the middle of the metopidium; apex broadly brown irrorated with pale; between the brown bands is a broad pale vitta on which is a median black mark on the carina. This pale vitta is extended upward along the carina to the posterior angle of the crest. Elytra nearly hyaline, the apical fuscous vitta narrow, not extending forward of the costal margin of the terminal areole. Median pale carina varied with black on the metopidium and there is a black point on the anterior margin of the metopidium above each eye. Face pale. Beneath pale varied with brown. Length 9–10 mm.

Described from four females. Two of these I took at Milan, Ohio, on September 1st, 1905; one was taken in New Jersey by Mr. W. T. Davis, and one from Ithaca, N. Y., is in the Cornell University collection. The specimen from New Jersey has the crest distinctly inclined forward while that from Ithaca has the hind angle of the crest produced in a distinct "step" similar to that found in *Heliria*, to which genus this species is further allied by its prominent humeral angles. I have tried to identify this with Goding's *Heliria Strombergi* but his description of the crest is quite unintelligible to me. It is just possible that *Telamona barbata*, described below, may be the male of this but I cannot so place it now.

2. **Telamona pyramidata** Uhler.

This is a slender species recalling *Glossonotus*. The pronotum is similarly elevated and is marked with the same white dorsal vitta behind the crest which is placed farther back and is more sloping. The crest is elevated as in *declivata* but consists almost entirely of the anterior foliole on the posterior slope of which the hind angle sometimes is indicated. *Declivata* is a larger species its pronotum is more coarsely punctured, its apex more produced and acute, and the crest is more vertical, highest anteriorly and slopes posteriorly to the very obvious hind angle, and the fuscous spot at the apex of the elytra is also narrower. *Telamona pyramidata* inhabits the mountains of Colorado.

3. **Telamona barbata** n. sp.

A small species allied to *pyramidata* Uhler, with an oval dorsal crest and hirsute surface, at least in fresh examples. The following description is drawn up from the male, the only sex known to me.

Head short, hirsute, apex of the cheeks strongly sinuated, but little oblique; basal suture of the clypeus rounded, rather deeply impressed; its apex continuing the apical contour of the head, not at all or scarcely produced. Pronotum low; humeral angles rounded, little produced; dorsal crest erect, placed on the middle of the dorsal line well behind the humeri, squarish, the anterior and posterior margins sloping about equally, its angles rounded, especially the anterior; superior edge sloping posteriorly; posterior process short, slender and acute at apex, reaching about to the base of the terminal areole of the elytra. Length 8 mm.

Color pale testaceous brownish. Head and metopidium finely punctured and irregularly dotted with minute black points and dashes; pronotum behind the humeri coarsely punctured, most of the punctures brownish. Crest abruptly fuscous brown, its basal margin irregular and edged with pale, its surface either side with a few large drawn pale dots, its hind edge with a broad whitish ray reaching from the upper angle to about one half the length of the posterior process; sometimes the brown on the crest is extended downward along the borders of the pale ray and covers the posterior process. Median carina black alternated with white dots on the metopidium. Elytra hyaline; very narrowly coriaceous and punctured at base; fuscous cloud broad, covering the whole width of the apex, nervures except at base brown. Beneath pale; the abdomen, tibæ and tarsi brownish.

Described from four males in the Cornell University collection all of which were taken at Ithaca, N. Y., in June, and Prof. Wickham has sent me a male taken by him last summer at Cloudcroft, N. Mex. This last specimen is much darker in color; the lower surface and legs being almost entirely black; the dark vitta covering the crest and apex of the pronotum is nearly black and is invaded by an extension of the pale ground color on either side at base of the crest, and the pale posterior ray is extended to either margin as a transverse vitta. Both of these pale extensions are indicated in the paler New York specimens.

It is possible that this may prove to be the male of some previously described species but I have been unable to so locate it. It is very near *pyramidata* Uhler but the form is stouter, the crest is shorter and less elevated and more truncated at apex. The characteristic color pattern on the pronotum of this species is more or less distinctly visible in *pyramidata* but this latter species has a much longer posterior pronotal process.

4. **Telamona viridia** Ball.

I frequently beat this species from poplar trees at Denver, Pueblo and other localities in Colorado. It somewhat resembles *reclivata* in form but has the dorsal crest more as in *barbata* only still more reduced and conical. The cabinet specimens are of a clear light yellow but in life many individuals are of a light yellowish green.

5. **Telamona obsoleta** Ball.

Closely allied to *Westcotti* Godg. but with a lower and more rounded crest. I have one clearly marked female of this species which was taken at Galesburg, Ill. In this the head has the black markings substantially as in *Westcotti*; on either side of the pronotum is a sinuated blackish vitta from over the inner angle of the eye, which, from above the humeral angles curves elliptically to the lateral margins behind the apex of the crest and is bordered with paler below; between these vittæ the surface is darker. In the Cornell University collection is a pale obscurely marked example, apparently of this species, that was taken at Ithaca, N. Y. In this species the fuscous apex of the elytra is cut off obliquely outwardly on the line of the anterior margin of the terminal areole. In both these individuals the crest is lower than pictured by Prof. Ball but I can hardly doubt the determination.

6. **Telamona Westcotti** Goding.

In the Cornell University collection are two females and one male that almost certainly belong to this species. One pair was taken at Ithaca, N. Y., and the other female is from North Carolina. The pair from New York is very clearly marked, the female being almost black and white. In this species the crest is long and low, abrupt behind and moderately so before where the median carina is much elevated; the metopidium is mostly blackish with a white line on the median carina; the apex of the pronotum, a transverse band across the posterior end of the crest, and a long narrow marginal spot before this are also blackish. In the male the metopidium is mostly pale; the other dark markings are paler brown irrorated with light grey and the crest is shorter and higher but has the same squarish form. The female from North Carolina is soiled yellow with the dark markings distinct but much reduced. *Telamona irrorata* Goding is I believe near this species but I have been unable to locate it.

7. **Telamona reclivata** Fitch.

This is a difficult species to delimit and I do not feel certain about all the material I have placed under the name. Eventually it is probable that at least two species will have to be distinguished here in addition to *lugubris* and *decorata* of Ball which are closely allied to it. Butler is mistaken in placing this as a synonym of *cyrtops* Fairm. It is likely that he was unacquainted with the true *reclivata.*

8. **Telamona monticola** Fabricius.

Thus far I have been unable to locate this species to my satisfaction. It seems to be near *querci* Fitch but the outline figure given by Fairmaire shows a different form of crest so for the present I prefer to leave it unidentified.

9. **Telamona querci** Fitch. Pl. 2, fig. 7.

The species I have identified as this is not uncommon in western New York and I have received it from many correspondents in the eastern United States and Canada, and from Prof. Wickham I have received one taken at Carson City, Nevada. This insect is of a dull greenish or olive brown with numerous pale points and a whitish lenticular ray on the posterior margin of the crest. So far as my observations go the crest in this species is never so high and slender as represented by Emmons in his figure but a variation not uncommon in this genus would cover this discrepancy. I believe *Telamona brunneipennis* Buckton to be but a synonym of this species.

10. **Telamona ampelopsidis** Harris.

A common and well known form found everywhere on the Virginia creeper. The males are shorter than the females and usually much darker, sometimes almost black, but even in these dark examples the sides of the pronotum below the crest are paler, showing the outline of the brown vitta characteristic of the female. It was redescribed by Fairmaire as *Thelia cyrtops*.

11. **Telamona coryli** Fitch.

This species is very close to *ampelopsidis* but it is proportionately shorter. It has the square crest of that species but the whole pronotum is more or less fuscous irregularly mottled with paler which at times may cover nearly its entire surface; but in all cases the anterior margin of the crest is distinctly fuscous or brown and on its posterior one half is a broad brown vitta which is dislocated on its base and then runs straight to the lateral margins; either side of this band the surface is paler and the apex is brown or fuscous. The apex of the elytra is marked with a dark fuscous spot which covers the terminal areole and invades both those adjoining it. In *ampelopsidis* there is a broad fuscous brown vitta running obliquely forward from the middle of the lateral margins and covering the entire dorsal crest except a central spot superiorly; the pale line bordering the inferior margin of this vitta follows the base of the crest across the metopidium and is sharply sinuated at either anterior angle. The fuscous spot on the apex of the elytra is narrower and outwardly does not quite cover the terminal areole. In *coryli* the clypeus is shorter and less distinct and the surface of the face is more deeply and transversely impressed across the base of the clypeus than in *ampelopsidis* where it is distinguished by the usual incised angled line.

The male of this species is almost entirely fuscous and heretofore has been identified with *tristis* Fitch but I have in my collection a female taken near Quinze Lake, Quebec, by Mr. W. J. Palmer and have seen another taken at Westfield, N. J., by Mr. W. T. Davis that are darkened to an almost uniform fuscous and agree very completely with the description of *tristis* given by Dr. Fitch. In view of this I am inclined to look upon *tristis* as a melanic form of *coryli*. I still prefer to use the name *coryli*, representing as it does the ordinary color pattern of this species, and place *tristis* as a mere color variety although its description preceded that of *coryli* on the page. *Telamona spreta* is certainly but the strongly marked female of this species.

12. **Telamona concava** Fitch.

The Cornell University collection contains three examples that agree very satisfactorily with the short description given by Dr. Fitch for this species, and almost exactly with the figure and description of *ornata* by Emmons in the Natural History of New York. I feel little doubt of the identity of *concava* and *ornata* In form and general pattern of marking this species is perhaps most closely related to *ampelopsidis* but it certainly is distinct. I have seen only females: all taken about Ithaca, N. Y.

13. **Telamona sinuata** Fowler. Pl. 2, fig. 9.

In the Cornell University collection is one specimen that I place here with some doubt. It has a narrow high crest with its anterior and posterior margins vertical, its dorsal edge sinuated with the anterior angle acutely rounded and quite strongly elevated and the posterior angle acute. This crest is placed well behind the humeri and is about square. The posterior process is long, obtuse at apex, with a median and three strong lateral carinæ. The color is cinerous varied with fuscous especially on the posterior process, dorsal crest and base of metopidium. The median carina is maculated with black and white and carries a broad whitish vitta before the crest and another behind; about half the length of the latter vitta is on the posterior process, the extreme tip of which is white. Apex of the elytra deep fuscous. Legs dotted with brown. This specimen is a male.

Canon Fowler has described another insect as *Telamona albidorsata* which certainly is very near *Thelia Godingi*.

14. **Telamona cucullata** n. sp. Pl. 2, fig. 10.

Size and form of *Telamona ampelopsidis* but with the humeral angles more strongly produced and the dorsal crest forming a compressed oblique hood which in the female leans well over the metopidium. Head short, basal suture of the clypeus but poorly distinguished; its protracted apex narrow, strongly incurved and inconspicuous beyond the line of the cheeks; face pale closely and evenly inscribed and dotted with brown. Pronotum rather slender; humeral angles strongly triangularly produced for about one and one half times the length of the eye, their apex acute; metopidium low, moderately convex, with a strong median carina. Dorsal crest beginning at the line of the humeri, hardly half the length of the pronotum, produced in a flattened tongue-shaped process which in the female is curved anteriorly and overhangs the metopidium, its superior and posterior edges forming almost a single curve, scarcely broken at the posterior angle; posterior process with about four indistinct longitudinal carinæ.

In the male the humeral angles are much shorter and less acute, being produced hardly more than the length of the eye. Dorsal crest much less produced anteriorly, its posterior angle more pronounced.

Color pale testaceous brown in the dried specimens. Pronotum marked much as in *ampelopsidis*, with an angled blackish line beginning at the middle of the lateral margin and strongly dislocated about an oblong blackish spot on either side of the anterior base of the crest; surface below this line paler as is the base of the metopidium; there are some pale marks on the middle of the crest and a linear vitta from the hind angle of the crest nearly to the apex; median carina of the metopidium carrying some black points and a larger spot above; which may connect with the oblique lateral black vittæ; humeral angles chestnut brown and polished in the female, darker and punctured in the male. In some examples the markings on the pronotum are almost obsolete. Apex of the elytra with a brown cloud. Length 9–10 mm.

Described from one male and three female examples in the Cornell University collection which were taken at Ithaca, N. Y. This species has the produced humeri of *Heliria* and perhaps should be placed there, but to do so would so alter the distinguishing characters of the genus as to leave it almost identical with *Telamona*. It might represent an extreme form of *Heliria* in which the anterior foliole of the crest had become so abnormally developed as to almost completely obliterate the posterior foliole which is represented by the merest angle on the posterior declivity of the crest. The hood in this species imitates in a way the porrect horn of *Thelia* but here it is strongly compressed which will at once distinguish it. This insect has the wing venation of *Antianthe* but the other characters are those of *Telamona* in which genus I believe it should remain.

15 **Telamona unicolor** Fitch. Pl. 2, fig. 6.

Here the females are light yellow or perhaps at times more or less tinged with green in life, with the extreme tip of the pronotum dusky. Fuscous apex of the elytra strongly defined, a little surpassing the terminal areole exteriorly. Crest high, rising almost perpendicularly close to the front of the metopidium, its dorsal edge feebly arcuated, sloping somewhat posteriorly and forming an obtuse angle with the oblique hind edge, highest point at the sharply rounded anterior angle.

The males are smaller with a shorter posterior process and smaller crest. In color they are very different, being of a creamy testaceous with a vitta on the anterior margin of the crest spreading over more or less of the metopidium, a narrow, nearly straight, and oblique vitta on the hind margin of the crest which passes down to the lateral margin, and the extreme tip fuscous. This species is found on chestnut trees throughout the northern states. I have taken it in Kansas and it probably occurs west to the Rocky Mountains and in southern Canada.

The male was described as *Telamona fasciata* by Fitch and again as *Hemiptycha diffusa* by Walker. *Telamona unicolor* as figured by Emmons can hardly be this species.

16. **Telamona extrema** Ball.

An interesting species with a still larger crest than in *unicolor*, and approching *mexicana* and *excelsa*. It was described from Iowa and Kansas but I have seen only New Jersey material.

17. **Telamona collina** Walker.

Described as a *Thelia*. Butler distinguishes it by its being "much more coarsely punctured than *unicolor* and with the humeral processes longer and more acuminate." It must, I believe, be near the following species.

18. **Telamona maculata** n. sp. Pl. 2, figs. 8,41.

Allied to *unicolor* in form but with the humeral angles much more produced. Head large, roughly sculptured, base with a crescent shaped smooth callus connecting with the ocelli; basal line of the clypeus deeply depressed; clypeus broad, smooth and rounding over the apex of the head. Pronotum short; humeral angles greatly expanded in broad ligulate appendages, obtuse at apex and produced for twice the width of the eye; dorsal crest high, subquadrate; its anterior margin just back of the line of the humeri, vertical or slightly overhanging, anterior angle rounded; dorsal line sloping; hind angle almost a right angle, posterior edge sloping slightly and broadly curved to the short apex on which the longitudinal carinæ are distinct. Color pale testaceous-yellow as in the male of *unicolor*, irregularly marked with brown vermiculations and spots, these forming a transverse band between the humeri, an oblong spot passing obliquely downward from the anterior angle of the crest and a smaller spot on its posterior angle. Apex pale brown, differentiated by an obsolete pale transverse vitta; middle of the lateral margin with a large oblong black spot. Beneath and legs pale, the tibæ minutely dotted with brown. Elytra hyaline, a faint cloud at the base, a conspicuous oval spot on the middle and a faint ray near the apex, fuscous brown. Length 10 mm.

Described from one female example taken on Long Island, July 13th, 1907, by Mr. W. T. Davis, who has collected a remarkably interesting series of Membracids about New York City. This species is very near *collina* Walker which would seem to have the same produced humeri but to want the conspicuous black spot on the sides of the pronotum and middle of the elytra. *Telamona mexicana* is another allied species.

Genus Telamonanthe Baker.

Prof. Baker established this genus in 1907 (Can. Ent. xxxix, p. 115) for *Telamona Rileyi* Godg., of which I believe *Coquilletti* Godg. is the female. Unfortunately the type specimens of this and the other Membracids described by Goding from material sent by me were never returned so I have only my memory to rely upon, but, so nearly as I can recollect it, *Coquilletti* is very near if not identical with *Telamona pulchella* Ball the male of which is *Telamona brevis* Ball.

Telamonanthe pulchella Ball.

I found this species abundant in the Garden of the Gods at Manitou and at other places in Colorado and it was not uncommon at Ogden, Utah. The males are very different in form from the females and it is not at all surprising that they were described as a distinct species. I am almost convinced that this is identical with *Telamona Rileyi* Godg. the female of which was described as *Coquilletti* Godg. The Cornell University collection has a broken female from Arizona that answers very closely to Goding's description of his *Coquilletti.* So far as I can make out it is but a color variation of *pulchella* Ball.

Genus Archasia Stal.

The form of the pronotum in this genus is much the same as that we find in Membracis but here the colors are a uniform green with brown or black points along the dorsal carina in some species. *Thelia conica* Walker, listed as an *Archasia* by Goding, is a *Telamona* near *extrema* Ball. *Thelia pallida* Fairmaire, placed in *Archasia* by Stal, is still unknown to me. Our other two species may be separated as follows:

Dorsal edge distinctly brown or fuscous, the contour obviously concave before the apex, 2, *Belfragei* Stal.

Dorsal edge concolorous or faintly dotted with brown, contour scarcely if at all concave before the apex, 1, *galeata* Fabr.

1. **Archasia galeata** Fabricius.

In the northern states at least this species is less abundant than the next. In the south it is probably the prevailing form. I have taken it in Colorado and Georgia.

2. **Archasia Belfragei** Stal.

This larger and more clearly marked species is the predominant form about Buffalo and in fact throughout the northern States. Like the preceding it is generally if not always taken on oaks. Prof. C. W. Johnson reports it as common in eastern Massachusetts two seasons ago. Mr. W. J. Palmer has taken it at Mt. Balsam, N. C.

Tribe Smiliini Goding.

Corium destitute of a transverse veinlet between the two interior longitudinal veins; pronotum strongly compressed and elevated, highest over the humeri, its front line vertical or nearly so, 1, *Smilia* Germ.

Corium with a transverse veinlet between the two interior longitudinal veins, 1.

1. Pronotum strongly compressed-elevated, or at least with a distinct crest posteriorly, 2.

–. Pronotum regularly transversely rounded on the dorsum, not at all compressed, 4, *Ophiderma* Fairm

2. Pronotum strongly elevated and compressed, humeral angles greatly produced, 2, *Antianthe* Fowler.

–. Humeral angles not greatly produced, the dorsum sometimes strongly compressed and elevated, but generally moderately elevated and highest at about the middle, 3, *Cyrtolobus* Godg.

Genus Smilia Germar.

Readily distinguished from our other genera of the *Smiliini* by the absence of a transverse nervure between the two inner longitudinal nervures of the corium. Our two species may be separated as follows:

Anterior line of the crest vertical or nearly so; oblique vitta linear, distinctly narrower than the space between it and the hind margin of the crest, 1, *camelus* Fabr.

Anterior line of the crest sloping backward and rounding over above the metopidium; oblique vitta distinctly broader than the space between it and the hind margin of the crest, 2, *fasciata* A. & S.

1. **Smilia camelus** Fabricius.

So far as I can make out this is the only described species of this genus that is typical. This assumes that *guttata* Fitch and *viridis* Godg. are simple varieties of *camelus*. I cannot accept Goding's synonymy of this species. *Membracis centralis*

Germar from Mexico seems to me to be a distinct species. *Smilia vittata* A. & S. is doubtless the same as *camelus* but their *fasciata* is certainly a very distinct species which is intermediate between this genus and *Cyrtolobus.* It differs from *Smilia* in having the dorsal crest highest at about the middle instead of anteriorly, and from *Cyrtolobus* in having it more elevated and placed more anteriorly. *Smilia camelus* I have taken about Buffalo, in southern Ontario and at Atlanta, Ga. I have a male from Austin Texas and Mrs. Slosson has sent me specimens from Mt. Washington in New Hampshire, and from Florida. The males are much smaller and darker than the females as is frequently the case in the allied genera, but always the dorsum is highest in front and slopes to the apex before which the contour is more or less sinuated.

2. **Smilia fasciata** A. & S. Pl. 2, fig. 12.

From Mrs. Slosson I have received a fine pair of this species taken by her in Florida. They agree with *Smilia* in every respect except in the form of the dorsal crest which is almost semicircular in outline. The female is dark brown becoming greenish grey anteriorly, and is crossed almost transversely by a very broad pale green vitta from the lateral margin to the highest point of the crest, touching the middle of this vitta tangentially is a narrow nearly vertical hyaline vitta, posteriorly in the subapical sinus is a small greenish dorsal line. Elytra nearly hyaline, rather broadly infuscated at apex. Length nearly 9 mm. The male is smaller, 7 mm., nearly black on the pronotum with the oblique vitta narrower and the median carina pale before.

This species approaches *Smilia* in the venation of the elytra but in the form of the dorsal crest it is almost exactly intermediate between this genus and *Cyrtolobus.*

Genus Antianthe Fowler.

Stal first described this genus as *Janthe* but as that name was preöccupied Fowler renamed it as above in 1895, and in 1902 Kirkaldy, overlooking Fowler's name, again named it

Agondas. Of the three or four described species one is occasionally taken along the southern borders.

1. **Antianthe expansa** Germar.

This insect has much the aspect of *Archasia* but the anterior line of the crest leans somewhat over the face and the posterior slope of the dorsum is rectilinear or nearly so from almost over the humeri. It can however be best recognized by the long slender humeral angles which are nearly as long as the space from their base to the median carina. In color they are green fading to yellowish testaceous with the dorsal carina dotted with black. They have been reported from the southern states and California.

Genus Cyrtolobus Goding

This genus, to which Dr. Fitch gave the preöccupied name *Cyrtosia*, is one of the largest as it is perhaps the most difficult to study of all our North American Membracids. Twenty six species are known to me, three others I have placed provisionally and four I have been unable to locate to my satisfaction. As in other large plastic genera many of the species are very closely related and might perhaps with equal propriety be regarded as varieties. The species known to me fall into four natural groups or subgenera. In the first or typical group (*Cyrtolobus* Godg.) the pronotum is compressed with a regularly rounded outline, beginning nearly or quite at the base of the metopidium and in the less typical species becoming attenuated and distinctly arcuated posteriorly, or it may be less compressed, some times scarcely more than carinated above with the crest placed well back and showing a distinct sinus at its anterior base. In the second (*Atymna* Stal) the pronotum is compressed, elevated anteriorly; with its highest point above or before the humeri. In the third group (*Evashmeadea* Godg.) the form is more elongated, the crest is low and is deeply sinuated on the middle, and the apex of the pronotum is produced in a slender acute process. In the fourth (*Xantholobus* VanD.) the crest is placed still farther back, is strongly inflated and deeply compressed at the middle leaving an almost bulbous inflation before and a smaller one behind. In all these groups the crest is laterally compressed at its middle where it sometimes becomes membranous and subhyaline. *Cyrtolobus fenestratus* Fitch may be taken as the type of the first group as it is of the genus, *Atymna castaneæ* Fitch of the second, *Evashmeadea concinna* Godg. of the third, and *Cyrtolobus inflatus* VanD. of the fourth.

The typical marking of *Cyrtolobus* is that seen in *fenestratus* and *vau* and still more clearly in *limus*. An oblique anterior vitta beginning at the middle of the lateral margin and meeting in an acute angle on the dorsal line at the anterior base of the crest; a median dorsal spot, usually square or squarish, at the middle of the dorsal margin of the crest; and a transverse vitta at the posterior base of the crest, which may become oblique and approach the base of the anterior vitta on the lateral margin. The apex of the elytra has a fuscous cloud which may be elongated, clearly differentiated, diffuse, or altogether wanting. The tergum in the female is normally black or dark brown with its base rather broadly pale. Among the best characters for distinguishing the species are the form of the clypeus, loræ, and cheeks, and of the dorsal crest. The latter character however is subject to much variation, within certain limits, in the same species. The form of the genitalia I have found to be of very little value in discriminating the species, and the characteristic marking may be distinct in some individuals of a species and almost entirely obscured in others; this is especially the case when the specimen has not become fully matured. The male is frequently smaller, much more deeply colored, with the dorsal crest less elevated than in the female. Here the females are much more frequently taken than the males and in many forms the male is still unknown to me.

In the synonomy I have used Emmons' name on all those species first published in the insect volume of the Natural History of New York. The specimens and determinations were supplied by Dr. Fitch but there is no evidence that he drew up the descriptions and in fact there is strong evidence that he did not write them. I cannot accept Mr. Kirkaldy's rehabilitation of a mere typographical error, *Cyrtoisa*, for this genus. Dr. Fitch himself wrote the name *Cyrtosia* and we must so accept it.

I have a fair recollection of the specimens from which Dr. Goding drew up the description of his *Smilia Vanduzii*, later placed by Prof. Baker in *Cyrtolobus*, and they certainly were distinct from any species now before me. *Cyrtolobus arcuatus* Emmons is nearest to *ovatus* described below but, judging from his figure and description, it is more strongly sinuated posteriorly and the colors are darker with a transverse dusky band near the hind angle of the crest. It is still unrecognized by me.

In the following key I have attempted to arrange our subgenera and the species known to me so that the student may be able to place any of them with reasonable certainty. In the case of some of the closely related forms it has been found necessary to make use of certain comparative characters, an unsatisfactory expedient at best, but with a few of the well known forms determined it should not be difficult to locate the others.

KEY TO THE SUBGENERA.

Pronotum strongly inflated posteriorly, the crest forming an inflated cyst before and behind the median pale spot, *Xantholobus* V. D.

Pronotum not strongly inflated, the crest however, usually more or less distinctly compressed on the median spot, 1.

1. Dorsal crest low and sinuated at the middle; form elongated and much depressed, *Evashmeadea* Godg.

–. Dorsal crest not distinctly sinuated above, 2.

2. Crest highest anteriorly over or before the humeral angles, the dorsum sloping and nearly rectilinear to the apex, *Atymna* Stal.

–. Crest regularly arcuated above in the more typical examples, or in any case with the highest point at or near the middle, *Cyrtolobus* Godg.

Subgenus Cyrtolobus Goding.

Dorsal crest strongly elevated and regularly arcuated from the base of the metopidium, at most with a slight sinuation posteriorly, 1.

Dorsal crest proportionately less elevated, with a sinus at its anterior base, 3.

1. Darker with the characteristic markings distinct, 1, *fenestratus* Fh.

– Paler with the characteristic markings obscured, 2.

2. Pale yellowish (or green in life?), immaculate or nearly so, 2, *ovatus* VanD.

–. Sides of the pronotum with a transverse brown band posteriorly (Emmons), *arcuatus* Emm.

3. Crest rather high, placed well forward, subtriangular, rounded at summit, its anterior and posterior declivities nearly rectilinear, posterior process slender, sinuated, and acute at apex; markings distinct; length 8 mm.; inhabits Arizona, 6, *grandis* VanD.

–. Crest when elevated regularly arcuated superiorly, 4.

4. Crest well elevated, beginning forward nearly to the front line of the metopidium but still with a distinguishable sinus at its anterior base, 5.

–. Crest when elevated beginning above or behind the humeri, 7.

5. Posterior sinus wanting, the dorsal line rectilinear from the highest point over the humeral sinus to the apex; markings distinct, 7, *sculptus* Fairm.

– Posterior sinus obvious but not deep, the dorsal line before it rounding to the highest point at or about the middle of the pronotum, 6.

6. Color fuscous brown with the markings obsolete, margins of the cheeks rectilinear or slightly sinuated, 3, *fuliginosus* Emm.

– Color pale ferruginous to brown; the markings represented by the anterior oblique vitta and a brown line bordering it posteriorly, 4, *muticus* Fabr.

7. Larger, 9 mm.; crest well elevated with a strong sinus at either end; the characteristic markings strongly distinguished; the median spot connecting with the anterior vitta at an angle, 5, *tuberosus* Fairm.

–. Smaller, 7 mm. or less in length, 8.

8. Crest moderately elevated; the dorsal line regularly arcuated, the males frequently much lower and merely carinated above; elytra hyaline or nearly so, 9.

–. Form recalling *Ophiderma*, broad and transversely rounded, with the crest but little elevated; elytra usually fuliginous or maculated, 16.

9. Characteristic markings distinct, at least in the mature females, 10.

–. Characteristic markings more or less obscured or obsolete, 12.

10. Clypeus carinated, produced at apex in a slender acute process; inhabits the Rocky Mountain region, 12, *acutus* VanD.

–. Clypeus broad and rounded at apex, 11.

11. Color pale testaceous to brown in the females, more or less blackish in the males, 10, *vau* Say.

–. Color dark brown or black, with the markings strongly contrasted, irrorated with pale anteriorly; a little larger than *vau* with the crest more elevated and the anterior vitta meeting in a more acute angle, 11, *limus* VanD.

12. Dorsal crest moderately elevated, regularly arcuated from the base of the metopidium, the anterior sinus hardly distinguished; characteristic markings represented at least by the anterior vitta, the posterior faintly indicated, 13.

–. Crest less elevated; markings, if present, represented by slightly oblique fuscous vittæ and brown frontal spots, 14.

13. Elytra faintly fuliginous, apex broadly fuscous; metopidium with an arcuated brown ray on either side, which is continued across the face next the eye, 8, *discoidalis* Emm.

–. Elytra hyaline; female pale greenish yellow with the anterior oblique vitta represented by an arcuated black line meeting in an acute angle on the dorsal carina; behind this line paler and faintly banded; male black with the vittæ slender and white, 9, *cinctus* VanD.

14. Color ferruginous or fuscous brown, immaculate or nearly so, 14, *intermedius* Emm.

–. Color whitish or pale greenish yellow at least in the female, 15.

15. Color pale testaceous or whitish, immaculate or with a cloud on the metopidium which may be divided, and two faint fuscous vittæ behind the middle, 13, *maculifrontis* Emm.

–. Color a uniform yellowish green in the female; in the male blackish with two posterior white bands, 15, *inermis* Emm.

16. Elytra almost hyaline with the apex fuscous; color greyish brown with the markings obscured; clypeus very broad, convex and rounded before, 16, *griseus* VanD.

–. Elytra fuliginous or banded, 17.

17. Elytra dark fuliginous in the female; clypeus but little incurved at apex, 18, *fuscipennis* VanD.

–. Elytra transversely banded with brown and whitish, its apex fuscous; general color cinerous becoming ferruginous anteriorly; clypeus strongly incurved, 17, *cinereus* Emm.

1. **Cyrtolobus fenestratus.** Pl. 2, fig. 15.

After a careful study of all the species of this genus known to me I have placed this name on the form here described as it is the only one that answers to the description of the genus as well as to that of the species. I believe that the examination of the type, if such were possible, would uphold me in this determination.

Pronotum well elevated, highest at about the middle, almost regularly arcuated from base to tip, the dorsal line a very little broken at the posterior vitta. Head and the pronotum anterior to the oblique line pale yellowish testaceous, punctured and varied with brown; from above each eye a brown indefinite vitta curves backward over the humeral angle; anterior oblique vitta almost perpendicular at first, approaching the elongated median mark then deflected and again widened at apex so as to pass almost straight across the dorsal carina; posterior vitta transverse, represented in my Atlanta specimen only by a narrow spot on the carina; the surface behind the anterior vitta darker, in one example almost piceous. Elytra hyaline, the smoky apex small and pale. Face coarsely punctured; clypeus broad, moderately produced, and strongly incurved. Length 6 mm., height 3 mm.

Of this form I have seen but three examples, all females, one of these I took at Atlanta, Georgia, in May 1899; another was taken on Staten Island in July by Mr. W. T. Davis, and the third was found by Prof. Barlow at Waltham, Mass. In these the tip of the pronotum just about reaches the apex of the elytral areoles but does not surpass them. In *fenestratus* and its near allies the pronotum is strongly and regularly arched from its base almost or quite to its apex and represents the typical form of the genus.

2. **Cyrtolobus ovatus** n. sp. Pl. 2, fig. 14.

Form nearly of *fenestratus* but the outline of the pronotum a little more elliptical and the posterior process more produced and acute and distinctly deflected. Color of the dried specimen soiled yellowish testaceous, sparcely but quite evenly dotted with smooth pale points; the dorsal carina minutely dotted with brown and marked with a nearly obsolete hyaline line in the posterior sinus. Face small, closely punctured; the clypeus prominent; abruptly incurved at apex but not exceeding the cheeks. Beneath and legs concolorous, pale; tarsal claws and oviduct fuscous. Elytra nearly hyaline, its apex very faintly smoky. Length 6 mm.

Described from four females. One of these was taken by me at Atlanta, Georgia, in May and three were taken by Mr. W. T. Davis, two at Lakehurst, N. J., and one on Staten Island. This species is nearest to *fuliginosus* but the form of the pronotum is quite different.

Cyrtolobus arcuatus Emmons must be closely related to this but his figure shows a form much more sinuated posteriorly and he indicates a transverse brown or fuscous vitta behind the middle which is not discernable in this species.

3. **Cyrtolobus fuliginosus** Emmons.

Dr. E. P. Felt has kindly sent me for study, from the State Museum at Albany, an example of what I believe to be the species figured and described by Emmons. It is near to the species here described as *ovatus* but the pronotum is proportionately more elevated with a deeper sinus both before and behind the crest. The face is more convex and uneven; the margin of the cheeks are nearly rectilinear; the clypeus and loræ are more strongly differentiated with the former more convex and produced at apex. In *fuliginosus* the pygofers of the female are unusually slender while in *ovatus* they are very short and abruptly narrowed at apex.

Color dark ferruginous brown without markings, a little lighter on the head and base of the metopidium, sutures of the face and the median line black. Legs pallid. Elytra with a fuscous cloud beyond the middle.

This species is very close to what I here determine as *muticus* Fabr. and much resembles a dark discolored specimen of that species in which the oblique line is obsolete, but the characters of the face seem to be sufficiently distinct. This specimen is without locality.

4. **Cyrtolobus muticus** Fabricius. Pl. 2, fig. 16.

Form nearly of *arcuatus* Emmons as figured by him. Pronotum well elevated; dorsal outline sinuated both before and behind the crest which is regularly arcuated above from a point over the humeri almost to the tip of the abdomen; surface coarsely punctured. Color pale yellowish inclined to ferruginous or at times almost fuscous brown; oblique anterior vitta distinct, bordered posteriorly by an equal band of much darker color; before this vitta the ground color is paler with some black points along the median carina; posteriorly the median dorsal spot is rarely indicated but there is at times a pale line on the carina in the posterior sinus: apex of the pronotum long and straight, almost or quite attaining the tip of the elytra. In dark examples the metopidium is more or less mottled, and in pale specimens an arcuated brown vitta is sometimes indicated above the humeri. Face roughly punctured, uneven at base; clypeus prominent, convex, but little exceeding the cheeks. Elytra subhyaline, in fuscous examples quite strongly enfumed, apex not at all darker. Beneath concolorous; oviduct blackish at base. Length 7mm.

I have taken this species at Atlanta, Ga.; Mr. W. T. Davis has sent me specimens from Staten Island; Mr. Z. P. Metcalf specimens from Ohio; Prof. John Barlow from Rhode Island, and in the Cornell University collection are others from Ithaca, N. Y., and from North Carolina. This species may readily be recognized by the double (dark and light) oblique vitta and the long pronotum. It does not agree entirely with the descrip tion given by Stal in the Hemiptera Fabriciana but it answers better than any other known to me, and it is the species determined as *muticus* by Dr. Uhler according to a specimen in the Cornell University collection. The specimens I have recorded above vary much in the depth of color but I believe they pertain to one species.

5. **Cyrtolobus tuberosus** Fairmaire. Pl. 2, fig. 18.

Large and strongly marked with an elliptical crest placed well back. Pronotum moderately elevated, crest rather abrupt, reaching from behind the humeri to or nearly to the apex of the abdomen, regularly elliptical in form. Metopidium well rounded in both diameters with a slight median carina; apex rather slender and acute, sometimes a little decurved. Color pale testaceous brown tinged with ferruginous on the head, anterior margin of the metopidium, and over the humeral angles; anterior oblique vitta generally distinguishable above, distinct below the middle where it connects with the elongated vertical median spot which is nearly hyaline; behind the oblique vitta the surface is dark brown; the posterior vitta sometimes merged in a pale tip. Elytra hyaline with a punctured blackish base and an elongated fuscous tip. Tergum black with a broad white band at the base which shows through the elytra. Head broad triangular, finely punctured; margins of the cheeks, loræ and clypeus jointly rectilinear or nearly so. Beneath and legs pale brown. Length 8–9 mm.

Fairmaire's description answers excellently to individuals of this species in which the anterior vitta is obsolete above the junction of this vitta with the median spot. It then forms an angled transverse band as described by him. This is the largest species of *Cyrtolobus* known to me. I took several examples at Atlanta, Ga., in May 1899, and in the Cornell University collection is a specimen taken at Ithaca, N. Y.

6. **Cyrtolobus grandis** n. sp. Pl. 2, fig. 17.

Large, elongated, suggesting a small *Smilia camelus*. Dorsal crest nearly semi-circular in outline, beginning a little before the humeri, almost up to the front of the metopidium; behind sloping away to the slender and acute posterior process which very nearly attains the apex of the elytral areoles in the female. Color pale ferruginous or testaceous yellow, very coarsely punctured. Anterior pale vitta broad and diffuse anteriorly at base, bent at about the middle and running thence almost vertically over the crest distinctly behind its base; the surface behind this vitta darker brown; median dorsal spot lengthened downward about one half way to the margin, pushed well back by the greater elevation of the crest anteriorly; posterior vitta nearly obsolete, placed as usual at the posterior sinus. Metopidium with a ferruginous or black mark above each eye. Elytra hyaline with the narrow apex infuscated. Tergum brown with the usual pale base. In the male the crest is lower, the posterior process is a little shorter, the anterior oblique vitta is scarcely defined and the tergum is black with a narrow pale base. Face in both sexes rather even, loræ scarcely distinguished from the cheeks; clypeus prominent, convex, produced for a third of its length beyond the loræ, and strongly incurved in the female; much less produced in the male. Length 8 mm.

Described from one pair in the Cornell University collection taken in Arizona. I have adopted the MS name given to this species by Dr. Uhler. This insect has a superficial resemblance to *Smilia camelus* but the crest is much less elevated and is highest at about its middle, and it differs generically in having a cross vein between the two interior longitudinal nervures. In the form of crest *Smilia fasciata* is just about intermediate between this species and *Smilia camelus*.

7. **Cyrtolobus sculptus** Fairmaire. Pl. 2, fig. 20.

Nearest to *discoidalis* but more elevated anteriorly and the vittæ more oblique. Pronotum moderately elevated; crest rounding anteriorly to the highest point a little behind the humeri; thence the dorsal line is almost rectilinear to the apex. Anterior oblique vitta straight, sometimes dilated anteriorly at base, the surface before it pale ferruginous with a brown ray or curved vitta on either side of the metopidium; behind this oblique line the surface is darker brown or sometimes blackish next the line; median dorsal spot subhyaline, longer on the carinate edge than high; posterior vitta narrow, oblique, almost connecting with the anterior at base. Head sparcely punctured; clypeus and loræ large, their basal suture acutely angled; apex of the clypeus strongly incurved beyond the loræ; margin of the cheeks distinctly sinuated. Elytra hyaline; brown and punctured at base; apex a little smoky. Beneath ferruginous; legs brown, oviduct black at base, rufous at apex. Length 6 mm.

Of this species I took three females at Milan, Ohio, in September 1905. They are a little smaller and darker than indicated in the description by Fairmaire but of all the species known to me this is the only one fitting his description reasonably well. I doubt if his species can be placed more definitely without a study of his types.

8. **Cyrtolobus discoidalis** Emmons.

Allied to *vau* but rather larger and differently marked. Color yellowish testaceous punctured with darker. Metopidium with a broad arcuated vitta on either side, which is continued down over the face exterior to the ocelli. Dorsum moderately elevated, about as in *vau*. Anterior oblique line a little sinuated, meeting in an acute angle somewhat behind the humeri; dorsal median spot spread along the upper carinate edge, evanescent below. The posterior vitta nearly obsolete. The anterior oblique vitta is followed by a darker or even fuscous shade which may fill in the angle before the median spot. Elytra nearly hyaline, slightly enfumed, apex fuscous, base punctured as usual. Face rather even, strongly punctured; ocelli prominent; clypeus and loræ fused, their basal suture slender but distinct; clypeus broad, its apex well produced, strongly incurved and obtusely angled.

Of this species I have seen three examples. One taken on Mt. Balsam, N. C., by Mr. W. J. Palmer of Buffalo; one from Ithaca, N. Y., in the Cornell University collection, and one from Sparta, N. J., in the collection of Mr. W. T. Davis. This species is sufficiently distinct and I believe I have rightly determined it although in Emmons' figure the anterior oblique band meets in too obtuse an angle.

9. **Cyrtolobus cinctus** n. sp.

Size and form of *vau* nearly, the crest a little more elevated. Female: Color pale yellowish green in the dried specimen. Anterior oblique vitta represented by a slender clear-cut black line which meets the dorsal carina well forward above the humeri, and at about the middle curves suddenly downward to join the margin at a point a little behind the post humeral sinus; surface behind this black line paler or testaceous, crossed by two very obscure broad whitish transverse vittæ, the anterior of which curves forward somewhat. Elytra hyaline with the apex scarcely darker. Tibiæ slightly embrowned. Clypeus a little produced and rounded at apex. Length 6 mm.

Male: Almost black, becoming more piceous brown posteriorly; anterior oblique vitta slender, white, curved as in the female but obsolete anteriorly; posterior vitta whitish, broken and obscure. Elytra a little infuscated at apex; nervures brown, blackish at base. Beneath black with the legs pale. Face black, ocelli pale, sides of the clypeus at base and the callosities on the metopidium castaneous. Clypeus broad and rounded, scarcely exceeding the cheeks. Length 5 mm.

Described from one pair in the Cornell University collection taken at Ithaca, N. Y., June 23d 1885, by O. F. Pearce. I am not certain that these are sexes of one species but their shape and pattern of marking is so peculiar and so similar that I have thought it best to place them together in spite of the fact that the form of the head shows a greater variation than we generally find in one species. A difference in maturity however might well account for a part of this. If distinct the name should follow the female.

10. **Cyrtolobus vau** Say. Pl. 2, fig. 19.

This species is found commonly throughout the eastern United States and as far west as Colorado. Say's very concise description leaves no question as to its identity. Like the allied species it varies much in depth of coloring and somewhat in the elevation of the dorsal crest. The females are pale testaceous or yellowish brown, sometimes more or less tinged with ferruginous on the crest. The anterior oblique vitta is frequently broken, the dorsal portion forming a whitish spot on the anterior base of the crest, the inferior portion being slender above, and at times connecting with the large squarish median spot. The male is fuscous or blackish, becoming ferruginous anteriorly; frequently the anterior vitta is nearly obsolete above but forms a conspicuous triangular spot on the margin below the median spot; On the metopidium there is a pale area on the humeral angles and an indistinct whitish vitta either side of the median carina. The head is pale varied with ferruginous brown with the loræ distinct and the clypeus linear, rather broad, and well produced before the cheeks.

11. **Cyrtolobus limus** n. sp.

Allied to *vau* but darker and more clearly marked; perhaps only a variety of that species.

Female: pronotum little elevated, dorsum quite regularly arcuated, a very little sinuated at the posterior white vitta; posterior process short and obtuse, attaining the terminal areole. Face uneven, coarsely and sparcely punctured with blackish; margins of the cheeks very slightly sinuated. Clypeus and loræ large, well distinguished with blackish sutures, the former rather broad, parallel and distinctly exceeding the loræ and cheeks; rounded at apex. Color of dark examples deep piceous brown with the characteristic markings strongly distinguished. Pronotum anteriorly whitish irrorated and varied with dark brown; anterior white vitta less oblique than in *vau;* broad below, a little sinuated above; median dorsal spot oblong or nearly square, parallel with the posterior vitta and approaching the angle of the anterior vitta. Elytra subhyaline or somewhat infuscated, base and apex deep smoky brown the apical spot oblong and nearly covering the terminal areole. The anterior whitish vitta of the pronotum is continued across the elytra as an obscure whitish cloud which is made more distinct by the white base of the tergum beneath. Lower surface pale with black marks under the margins of the face. This black color may be spread over most of the lower surface of the thorax and on the femora. In pale examples the color of the pronotum is ferruginous brown deepened to fuscous along the borders of the white vittæ.

Described from four females taken by me at Manitou, Colorado, in July 1900. These were taken in company with *acutus* from which they may be readily distinguished by the broad rounded clypeus. They are still nearer *vau* but the oblique anterior vitta when viewed from above forms a more obtuse angle where it meets the dorsal carina. The stronger colors and maculated elytra may also assist in distinguishing it.

12. **Cyrtolobus acutus** n. sp. Pl. 2, fig. 21.

Aspect of *vau* but easily distinguished by the very slender and acute clypeus. Female: longer and more slender posteriorly than *vau*, the apex of the pronotum decurved and generally attaining the apex of the elytral areoles; the posterior sinus distinct; crest elevated about as in *vau* but this character is subject to variation in both species. Face coarsely punctured, uneven, apical margins of the cheeks distinctly sinuated; middle line of the clypeus strongly obtusely carinated, this carina produced considerably beyond the line of the loræ as a slender subacute point. Color a clear ferruginous brown; anterior oblique vitta entire; almost straight, well distinguished; surface before this line pale, punctured with ferruginous on the metopidium; ornamented above the inner angle of the eye with an oval ferruginous spot bordered with pale and a ferruginous cloud lies along the anterior oblique pale vitta; dorsal carina fuscous on the metopidium; median white dorsal spot squarish, longer than broad and directed a little backward away from the anterior vitta; posterior vitta running downward and a little forward to the margin but not meeting the anterior vitta. Elytra hyaline, the apical smoky cloud narrow, scarcely encroaching upon the apical areoles. Beneath paler brown, the abdomen whitish.

Male: smaller with the pronotum less elevated and shorter, not attaining the base of the terminal areole, not at all decurved. Color dark piceous brown or almost black; the white bands and median spot as in the female but more conspicuous. Metopidium slightly paler with a white margin around the humeral angles and embracing the posthumeral sinus. Face ferruginous brown dotted with paler. Beneath almost black, the tibiæ brown and the slender edges of the abdominal segments pale. Length: male 4–5 mm., female 5-6 mm.

Described from numerous examples taken by me from scrub oak in the Garden of the Gods at Manitou, Colorado, and at Ogden, Utah. The Cornell University collection has a good series from Arizona and Prof. Wickham has sent me both sexes from Cloudcroft, N. Mex. This species like *vau* varies to a uniform pale brown but the sharp clypeus and sinuated and decurved apex of the pronotum will readily distinguish it.

13. **Cyrtolobus maculifrontis** Emmons.

Very close to *vau* from which it differs principally by its pale color and the characters of the clypeus. Color pale testaceous or almost whitish-yellow. In fully marked examples there is a large blackish patch on the disk of the metopidium which is more frequently reduced to an oval spot on either side or is altogether wanting. The usual markings are here represented by an oblique fuscous vitta well back of the humeral angles, either side of which the surface is a little paler; posteriorly the pronotum is tinged with fuscous with the posterior transverse vitta indicated. Usually the dark markings are almost or quite obliterated. The coarse punctures over the whole surface are darker, sometimes almost fuscous in places. In this species the median carina is prominent over to the base of the metopidium and the dorsal line is very regularly arcuated and but little elevated. The face is pale, uneven, and coarsely punctured and the clypeus and loræ are fused; the former being distinctly transversely convex, its broad angularly rounded apex scarcely breaking the contour of the face. Length about 6 mm,

I took a strongly marked female of this species at Manitou, Colorado, and several of both sexes at Atlanta, Georgia, in May. If this determination is correct Emmons' figure is faulty in showing the anterior oblique vitta too transverse. It should be quite strongly angled as represented in *pallidifrontis* at figure 7 of the same plate,

14. **Cyrtolobus intermedius** Emmons

This is a small dark ferruginous or chestnut brown species in which the dorsum is but very little elevated. The head is lighter in color and strongly punctured with brown and there may be some light marks along the humeral margins. Here the clypeus and loræ are fused as in *maculifrontis* with their basal suture almost obsolete and their apical margin obtuse and nearly continuing the apical contour of the face. Of this species I have seen but four examples; two were taken by me about Buffalo, N. Y., and two from Ithaca, N. Y., are in the Cornell University collection. These latter are paler with faint suggestions of the dorsal median spot and of another mark below this on the margin, the latter apparently the base of the anterior vitta. *Cyrtolobus pallidifrontis* Emmons is still unknown to me.

15. **Cyrtolobus inermis** Emmons.

Closely allied to *inornata* Say. Female pale green or yellowish in the dried specimen, immaculate. Dorsum moderately elevated and regularly arcuated. Male smaller and less elevated than the female; the pronotum deep black polished, the base and extreme tip brown; crossed posteriorly by two transverse white vittæ; one behind the middle interrupted on either side, and a wider one before the pale apex; head chocolate brown with the clypeus black above; beneath and legs pale testaceous. Length: male 4, female 5 mm.

Of this interesting little species Mr. W. T. Davis has sent me several taken at Lakehurst, N. J., including the only males I have seen. I took one female at Ogden, Utah, in July 1900. Although so near *inornata* Say it has more of the *Cyrtolobus* aspect and I prefer to place it here rather than in *Atymna.*

16. **Cyrtolobus griseus** n. sp.

This form, which is very near *cinereus*, is of an almost uniform dark cinerous, closely punctured with fuscous. The only conspicous marking is the oblique blackish vitta which in *cinereus* bounds the hind margin of the anterior oblique vitta. Before and behind this brown band or line the surface is a little lighter and there is a suggestion of the median dorsal spot and transverse posterior vitta. In some specimens there is an arcuated longitudinal brown vitta on either side of the metopidium. Here the elytra are hyaline with the costal base ferruginous-grey and punctured, and the apex has a small fuscous cloud. The tergum is black with a broad white band at the base as in the allied species, which, showing through the closed elytra indicates the markings found on the elytra of *cinereus*. Face obviously longer and more convex than in *cinereus* with the basal middle depressed, and the clypeus and loræ together larger, the former much broader, more convex and more decurved and rounded at apex.

Described from three females taken by me at Effingham, Kansas, in July, 1900.

17. **Cyrtolobus cinereus** Emmons.

Larger than *vau* with the dorsum less elevated and the elytra maculated. Female: color cinerous tinged more or less with ferruginous, especially on the metopidium; anterior oblique vitta broad, indeterminate before, sharply distinguished behind by a narrow brown or fuscous line; median dorsal spot squarish or longitudinal placed close up to the angle of the dark oblique line; posterior transverse vitta frequently obsolete. Elytra ferruginous and punctured at base; this is followed by a whitish spot over the pale band on the base of the tergum, and continuing the broad pale anterior vitta of the pronotum; beyond this is a broad triangular fuscous cloud, the apical one third hyaline with a fuscous cloud at apex covering the terminal areole. Beneath pale marked more or less with black. Face about as in *vau* with the clypeus a little narrower and more produced. What I take to be the male of this species is nearly black with the characteristic markings more distinct, the anterior vitta bent over and following the humeral margin.

This is a broad coarsely punctured species recalling *Ophiderma.* The female has a peculiar cinerous look with the anterior brown and grey vitta placed well back and forming an obtuse angle on the dorsal line, but the maculated elytra are perhaps the best character for distinguishing the species. The only specimens I have seen have been from New York.

18. **Cyrtolobus fuscipennis** n. sp.

Closely allied to *cinereus* but with the elytra almost uniformly infuscated and the clypeus more produced and less decurved.

Color pale ferruginous varied with greyish testaceous, mottled with lighter in a broad band over the metopidium and along the oblique pale vitta. This oblique vitta more distinct than in *cinereus*, of nearly uniform width, strongly angled just before reaching the median dorsal spot, and running parallel for a short space and then meeting on the dorsal carina in a very obtuse angle; dorsal spot poorly defined and almost touching the angle of the anterior vitta; posterior transverse vitta usually distinct, the surface behind it a brighter ferruginous. Elytra almost uniformly rufo-fuscous, dark at base and then a little clearer across the anteapical areoles; the pale band on the base of the tergum showing through feebly. Legs ferruginous sometimes with a black band above on the femora. Face pale coarsely punctured with blackish, the elytral suture blackish. Usually there are four ferruginous or black points, two next the ocelli and two others above them on the base of the vertex. Clypeus linear and flat, its apex moderately narrowed, but little incurved and exceeding the loræ by nearly their own length. Pygofers of the female proportionately shorter and thicker than in *cinereus*. Length 6 mm.

Described from four females in the Cornell University collection taken at Ithaca, N. Y. and three females in the collection of Mr. W. T. Davis, two from Staten Island, N. Y., and one from Jamesburg, N. J. This species is very close to *cinereus* but the clypeus is more produced and less incurved, the anterior vitta is better defined and is strongly angled opposite the dorsal spot and then crosses the carina at a very slight angle. This with *cinereus* and *griseus* form a little group of species quite distinct from their congeners.

Subgenus Atymna Stal.

Large species, 7–9 mm.; pronotum well elevated anteriorly, 1.

Small species, 5–6 mm.; pronotum feebly arcuated above, 2.

1. Pronotum well elevated and rounded before, sinuated to the more slender posterior process; inhabits Arizona, 1, *simplex* VanD.

– Pronotum almost vertical before, sloping and nearly rectilinear to the apex, 2, *castaneæ* Fh.

2. Female more coarsely punctured; the face uneven with the clypeus narrow and distinctly produced and incurved at apex; blackish above with a yellow dorsal vitta, 3, *querci* Fh.

– Female green, polished, finely punctured; face smooth with the clypeus broad, rounded, and highly polished; male green like the female but smaller, less elevated and with the clypeus less tumid and polished, 4, *inornatus* Say.

1. **Cyrtolobus (Atymna) simplex** n. sp. Pl. 2 fig. 13.

Large and elongated, somewhat intermediate in form between *arcuatus* and the more typical forms of *Atymna*. In a measure recalling *Antianthe*. Pronotum well elevated; dorsal outline regularly arcuated from the base to the apex of the abdomen, there slightly angled and running thence nearly straight to the apex which attains the middle of the terminal areole; its highest point just behind the humeri. Whole surface pale yellowish testaceous, perhaps green in life, coarsely and evenly punctured, the punctures a little darker but not fuscous; dorsal carina black, serrated with pale below. Face more obscurely punctured; margins of the cheeks almost rectilinear; clypeus and loræ fused, their basal suture distinct and almost acutely angled. Clypeus broad, rounded at apex, strongly incurved. Base of the metopidium with a ferruginous mark above each eye. Last ventral segment longer than usual. Length 8 mm.

Described from two females from Arizona in the Cornell University collection. This insect suggests a transition to *Archasia* and *Antianthe* but it is much less elevated and is too attenuated posteriorly to be placed in those genera.

2. **Cyrtolobus (Atymna) castaneæ** Fitch.

This species is common and widely distributed in the eastern United States and Canada but of its western distribution I have little knowledge. It varies from a deep piceous black with a pale marginal line (*nigricephala* Emmons) to a uniform green (*viridis* Emmons.) So far as I know it occurs only on the chestnut. It is the type of subgenus *Atymna*.

3. **Cyrtolobus (Atymna) querci** Fitch.

Lives on oak and has probably about the same geographical distribution as the preceding. The males are easily recognized by their black color marked with a broad dorsal pale vitta which generally is interrupted before its apex. The females are very close to *inornata* Say but may be distinguished by the more coarsely punctured and less polished surface and the flatter and more uneven face with the clypeus narrower and distinctly produced and incurved at apex. The dorsum also is slightly less elevated.

4. **Cyrtolobus (Atymna) inornata** Say.

In this species the males are colored green like the females but they are smaller and have the dorsum rather less elevated. The polished finely punctured surface and the rounded polished clypeus are quite distinctive. In the females of this species and *querci* the dorsum is regularly arcuated and they might with perhaps equal right be placed in subgenus *Cyrtolobus* but they are most nearly related to *castaneæ* and I prefer to place them with that species. I have *inornata* from New York and North Carolina.

Subgenus Evashmeadea Goding.

Length 7 mm.; slender and depressed with the crest scarcely elevated and sinuated in the middle; characteristic markings distinct in matured individuals; posterior process of pronotum long, decurved and acute; inhabits Arizona, *concinnus* Godg.

Cyrtolobus (Evashmeadea) concinnus Goding. Pl. 2, fig. 22.

Larger and more elongated than *vau*. Female: head and pronotum pale yellowish coarsely punctured with brown, anterior oblique vitta not distinguished from the pale anterior surface of the pronotum, the hind margin of which it forms; near the base of the low dorsal crest it is bent at a right angle and passes almost straight across the dorsal carina. Surface behind this pale anterior vitta dark brown bordered with fuscous or black; the median spot nearly square, whitish; posterior vitta oblique and extended along the lateral margin to join the anterior vitta or pale surface. Elytra hyaline, base punctured; apex a little infuscated. Face large, even, coarsely punctured, regularly rounded before; clypeus and loræ scarcely distinguished, the former forming a very small rounded angle at the apex of the face, not at all incurved. Legs brown, the knees and edges of the femora pale, Pronotum long and low, the slender decurved apex almost attaining the tip of the elytra. Dorsum but slightly elevated, distinctly sinuated at the median spot and posterior vitta. In pale examples the markings are nearly or quite absent. Male: anterior pale surface strongly punctured and irrorated with brown; posterior dark portion blackish, the usual markings and margins whitish. Legs black. Abdomen dark brown with the narrow edge of the segments pale. Length about 7 mm. I have before me two males and four females from Arizona belonging to the collection of Cornell University. These bear the MS name *Cyrtolobus concinnus* given them by Dr. Uhler and adopted by Dr. Goding when describing the species. I prefer to consider this as the type of Dr. Goding's genus *Evashmeadea* as it is the only one answering to his description in having three longitudinal nervures at the base of the elytra. His other two species are the two sexes of a species of *Vanduzea*. This genus is not more distinct from *Cyrtolobus* than is *Atymna* and *Xantholobus*. They all run together and I prefer to place them at subgenera for the present.

Subgenus Xantholobus n. subg.

In general aspect intermediate between *Carynota* and *Cyrtolobus*. Form oval, pronotum swollen posteriorly, viewed from the side regularly arcuated from behind the humeral angles to the tip; without a posterior sinus in the more typical species; viewed from above much inflated and strongly compressed at the middle forming a large cyst or inflation before and a smaller one behind, the latter more or less confused with the swollen posterior disk of the pronotum. Elytra with three contiguous nervures at base and typical *Cyrtolobus* venation. Otherwise as in *Cyrtolobus*.

Surface hirsute; pronotum typical of the subgenus with the posterior inflation of the pronotum pronounced; anterior sinus placed well back, almost behind the post-humeral sinus, 3, *inflatus* V. D.

Surface smooth or nearly so; posterior inflation of the pronotum less pronounced, 1.

1. Size large, 7–8 mm.; Crest conspicuously inflated in two cysts, with a deep median compression; posterior sinus obvious, 2.

–. Size small, 4 mm.; anterior sinus obscure, just behind the humeral angles; crest regularly arcuated, but little inflated before, with a slight compression, posteriorly lost in the moderately swollen pronotal apex, 4, *nitidus* V. D.

2. Crest distinctly elevated with an obvious sinus before and behind; color ferruginous or rufous brown with the char-

acteristic *Cyrtolobus* markings more or less distinct; elytra almost hyaline with a brown median cloud in dark examples, 1, *trilineatus* Say.

–. Crest little elevated, with a feeble sinus before and behind; color a uniform rufous brown with a whitish marginal vitta on either side; elytra fuliginous, 2, *lateralis* V. D.

1. **Cyrtolobus (Xantholobus) trilineatus** Say. Pl. 2, fig. 23.

Crest moderately but distinctly elevated, placed far back, much inflated, when viewed from above forming two almost globular cysts, the anterior the larger. Color ferruginous brown in the female with the middle of the metopidium testaceous or whitish; the anterior oblique vitta is slender and is frequently broken above or merged with the pale median portion of the metopidium; posterior vitta broad, narrow edge of the pronotum and a slender longitudinal line above the humeri pale; these latter markings frequently obsolete. The males and at times the females, are of a rich chestnut brown color with some black marks over the eyes and about the pale vittæ posteriorly. Face triangular before with the slender clypeus much produced. Elytra hyaline or nearly so, with a fuliginous cloud at the middle in dark examples, and fuscous at tip in the males; base brownish, punctured. Length 7–8 mm.

Of this species I have before me specimens from New York, and Rhode Island but it doubtless occurs throughout the eastern United States and perhaps southern Canada.

2. **Cyrtolobus (Xantholobus) lateralis** n. sp.

Closely allied to *trilineatus:* a little smaller and more depressed. Crest little elevated; in the present specimen distorted anteriorly by the pin but apparently with a slight sinus over the post-humeral sinus; lateral compression deep, the posterior cyst rather less developed than in *trilineatus.* Color a uniform pale rufous brown, closely punctured and polished; lateral margins with a creamy white vitta, very narrow behind the eyes but widening posteriorly from the humeri to a point about under the posterior sinus. Posterior sinus feeble marked with a minute pale line on the carina. Elytra dark fuliginous, paler where it rests beneath the sides of the pronotum, rufous and punctured at base; inferior surface of the head black; face pale varied with ferruginous. Length 7 mm.

Described from one female taken at Ithaca, N. Y., in the Cornell University collection. This may be distinguished from *trilineatus* by its smaller size, less elevated crest, fuliginous elytra, and by the yellowish lateral vitta. On the metopidium either side of the median carina is an obscure paler ray suggesting the pale markings seen in *trilineatus.*

3. **Cyrtolobus (Xantholobus) inflatus** n. sp. Pl. 2, figs. 24, 25.

A robust hairy species. Dorsum regularly arcuated with a distinct anterior sinus over the posthumeral sinus. Crest scarcely carinated, deeply compressed at the middle, the small posterior cyst almost lost in the large hemispherically inflated apex of the pronotum. Color pale yellowish, punctured and varied with ferruginous and brown and with a broad angular belt of rufous brown across the middle of the pronotum, bounded before and behind with whitish bands; anteriorly this rufous belt is advanced so as to cover the anterior cyst of the crest, posteriorly it is eroded or slightly emarginate. Metopidium with a suggestion of a brown ray on either side, curved above the humeral angles. Elytra rufous brown at base with a pale band over the whitish base of the tergum; subhyaline toward the apex. Length 5 mm.

Described from one female taken by me at Manitou, Colorado, July 19th, 1900.

4. **Cyrtolobus (Xantholobus) nitidus** n. sp.

Small, finely punctured and polished. Pronotum very slightly carinate; dorsal outline regularly and gently arcuated, a very little sinuated at the anterior base of the crest, almost over the humeri; crest scarcely distinguished from the rounded surface of the pronotum, quite strongly compressed at the middle. Color bright castaneous brown, paler anteriorly; metopidium with a diffuse darker ray on either side above the eye; anterior oblique vitta slender, almost obsolete above, nearly or quite confluent with the small obscure median spot; posterior vitta broad, the small apex beyond it scarcely darker, attaining the terminal areole of the corium. Head large, convex, smooth, finely and closely punctured; anterior margin feebly arcuated; clypeus viewed more from below moderately produced with a rounded apex. Elytra subhyaline, castaneous at base and beyond the middle, with an indistinct whitish band over the pale base of tergum. Beneath pale; legs whitish, Length 5 mm.

Described from three females: one from Lakehurst, N. J., sent to me by Prof. J. B. Smith; the second I took at Washington, D. C., in June 1905, and the third was received from Mr. W. T. Davis who captured it on Staten Island, N. Y. Viewed from above the pronotum in this species is considerably swollen posteriorly. It is a neat and distinct little species.

Genus Ophiderma Fairmaire.

This genus may be distinguished by its depressed, transversely rounded form, straight dorsum, and in the case of some of the species by its very hairy surface. After a careful study of a long series of specimens I am convinced that the *O. salamandra* of Fairmaire is the male of our larger and duller species and *Gargara pubescens* of Emmons the male of our smaller and more clearly marked species. *Ophiderma flaviguttula* Godg. I have been unable to recognize although the description answers fairly well to some females of *pubescens* Emmons. The six species known to me may be distinguished as follows:

Dorsal line straight or a little depressed; terminal areole of the elytra triangular at base, 1.

Dorsal line somewhat elevated posteriorly, but not at all compressed, behind with a slight sinus; terminal areole of the elytra transverse scarcely bent on its basal line, 6, *nigrocinctus* V. D.

1. Color a uniform yellow, or clear green fading to yellow, 2.

–. Color brown, more or less distinctly marked with lighter, 3.

2. Pronotum short scarcely surpassing the abdomen; four dots on the face and crescent over the eye black; inhabits Arizona, 5, *pallida* V. D.

–. Pronotum attaining the apex of the elytra; face immaculate; inhabits the eastern United States, 4, *flava* Godg.

3. Dark chestnut brown becoming more or less flavous in faded or immature examples; a broad yellow marginal vitta on either side before the middle, which in the male becomes submarginal with a transverse subapical vitta, 3, *flavicephala* Godg.

–. Greyish or olive brown varying to castaneous or black in the male, more or less strongly marked with pale, 4

4. Larger, 7–8 mm.; dull brown, densely hairy, and obscurely marked; in the male inclined to castaneous with the markings more pronounced; margins of cheeks strongly sinuated, 1, *salamandra* Fairm.

–. Smaller, 5–6 ½ mm.; clearer brown and less hairy with the markings distinct; in the male black, clearly marked with white; margins of the face rectilinear or nearly so,
2, *pubescens* Emm.

1. **Ophiderma salamandra** Fairmaire.

Female: larger, more hairy and more obscure than the next, the pale markings sometimes entirely obliterated in the female. Color dull brown inclining to castaneous or sometimes to olive. Face and front of the metopidium paler, sparcely dotted or varied with rufous or brown; a brown point on the base above each ocellus. Callosities rufous. Markings frequently obscured; when distinct there is a strongly arcuated vitta from the middle of each lateral margin to the humeral angle, connected by a transverse vitta directly across the dorsum over the posthumeral sinus; a transverse dorsal spot at about the middle, nearly or quite connecting with the arcuated vitta; and a basal transverse vitta near the apex. Usually the arcuated vitta is obsolete anterior to the first transverse vitta, and frequently the median spot or vitta is very obscure. Sometimes the metopidium has an arcuated line either side of the median carina connecting with the anterior transverse vitta.

In the male the front of the pronotum is usually mottled with the callosities black, and the markings are obscured anteriorly and more distinct posteriorly than in the female. Here the elytra are hyaline with a brown cloud at base and a triangular one at apex.

This species I have seen only from New York, New Jersey and Massachusetts although it doubtless occurs throughout the northern states and Canada.

2. **Ophiderma pubescens** Emmons.

Smaller and more polished than *salamandra.* Female: brown, more or less tinged with castaneous, or almost piceous. Face and front of the metopidium pale or yellowish, more or less dotted with ferruginous and sometimes with a black point above each ocellus on the basal margin. Callosities generally black. When fully colored this species has about the same markings found in *salamandra* but usually there is a pale elongated vitta on the metopidium either side of the median carina.

The male is black with the face and a few irregular marks on the front of the metopidium white, the former with some black points and lines, including the clypeal sutures. On either side of the pronotum is an arched vitta from the humeral angle to the middle of the lateral margin and a transverse band before the apex white. In both sexes the elytra are brown or blackish almost to the apical areoles with a paler subbasal band, and the apex has a deep brown angular patch.

The Cornell University collection has a fine series of both sexes of this species taken about Ithaca and I have seen a few others from New York and Massachusetts. It probably has about the same range as the preceding species.

3. **Ophiderma flavicephala** Goding. Pl. 2, fig. 28.

The female of this species is easily recognized by its castaneous or piceous brown color and the broad yellowish marginal vitta from behind the eye to the middle of the lateral margin; the face, front of the metopidium and more or less of the apex is paler. The elytra are castaneous at base followed by a hyaline space broadest on the costa and a deep brown apex. The males have the lateral vitta raised so there is a narrow margin of the ground color below it, and there is a subapical pale transverse vitta. In all the males I have seen the ground color is paler, and in one the callosities are black. I have before me specimens of this species from Ithaca, N. Y., Lakehurst, N. J., and Florida.

4. **Ophiderma flava** Goding.

Readily distinguished by its green, or in the dried specimens yellowish, color, with the face and base of the metopidium pale, sometimes tinged with fulvous next the eye. Elytra pale fuliginous, darker at apex, before which is a hyaline area. In the Cornell University collection are specimens of this species from Ithaca, N. Y. and Mr. W. T. Davis has taken it on Staten Island.

5. **Ophiderma pallida** n. sp.

Pale yellow with a narrow slender pronotum. Face uneven but almost impunctate; basal margin and the sinuated edge of the cheeks a little reflexed. Clypeus broad, convex, polished, much produced and incurved. Pronotum low smooth and much flattened; metopidium receding from its base, confluently punctured in transverse rugæ; humeral angles rounded, not at all prominent; posterior process very narrow and acute at apex, but little surpassing the apex of the clavus and abdomen; posthumeral sinus shallow.

Color pale yellowish, probably green in life; face with eight black points: two adjoining each eye, two on the base behind the ocelli and one either side of the clypeus; some or all of these may become ferruginous or pale. Callosities forming a slender black line over the inner angle of each eye. Elytra hyaline, nervures slenderly fuscous; nervures of the wing fuscous and showing through the thin elytra. Tarsi tipped with black. Length 7 mm.

Arizona. Described from two females in the Cornell University collection bearing the MS name given it by Dr. Uhler and here adopted. This species is quite distinct from any other known to me by its short depressed pronotum and rugosely punctured surface.

6. **Ophiderma nigrocincta** n. sp. Pl. 2, fig. 29.

Color testaceous white. Head sparcely punctured with black; the sutures distinct; two minute points on the base of the vertex above the ocelli, a more or less distinct line within the rectilinear apical margin of the cheeks, and the sutures between the loræ and clypeus broadly, black. Clypeus parallel-sided, long, smooth, much exceeding the small almost triangular loræ, marked with a pair of minute black points at base. Metopidium with a slender deep black submarginal basal line which is continued around the humeral angles and is connected above each eye to an eroded black arc. Pronotum with a distinct smooth median carina, becoming castaneous or piceous behind the middle; this piceous area is broad, rather vague anteriorly, is bounded either side by an oblique white vitta and is crossed before the apex by a broad white band. Pale areas regularly dotted with deep piceous punctures. Elytra hyaline; exposed base of the clavus and basal two thirds of the very narrow costal areole coriaceous and punctured; nervures strong, white basally, fuscous toward the apex. Legs and chest more testaceous, the former lined with brown, and with the tips of the tibiæ and the tarsi black.

Described from one female taken by me near Manitou, Colorado, August 2d 1900.

Tribe Polyglyptini Goding.

Pronotum produced anteriorly in a long porrect process, 2, *Polyglypta* Burm.

Pronotum not produced anteriorly, 1.

1. Dorsum regularly convex transversely, punctured, not elevated in rugæ; terminal areole of the corium transverse, 1, *Vanduzea* Godg.

–. Dorsum more or less elevated, the surface with longitudinal rugæ which may become more or less reticulated; apical areole of the corium triangular, 2.

2. Dorsum strongly elevated, compressed, with a deep median sinus, 3, *Entylia* Germ.

–. Dorsum but slightly elevated, a little sinuated before the middle, 4, *Publilia* Stal.

Genus Vanduzea Goding.

This genus most closely resembles *Ophiderma* but may be distinguished by having but two contiguous nervures at the base of the elytra in place of three as in that genus and the terminal areole of the elytra is transverse, the bounding nervure on its base running almost straight across the apex. The costal areole only is coriaceous and punctured. In *arquata*, the type species, and in *vestita*, the dorsum is broadly rounded transversely; in *læta* it is carinated as in *Cyrtolobus*, while in *bajula* it is carinated and deeply sinuated as in *Evashmeadea*. Canon Fowler in the Biologia has redescribed this genus as *Hypamastris*. Dr. Goding described *bajula* from the female as an *Evashmeadea* on account of its bilobate dorsum, and the male as *Evashmeadea arizonensis*. Our species may be distinguished as follows.

Dorsum transversely rounded, 1.

Dorsum carinated, 2.

1. Larger, 5 mm.; costal areole coriaceous and puntured for nearly its whole length, 1, *arquata* Say.

–. Smaller, about 4 mm.; costal areole almost entirely hyaline, concolorous, sparcely punctured toward its base, 2, *vestita* Godg.

2. Dorsal carina strongly sinuated, 5, *bajula* Godg.

–. Dorsal carina arcuated, not at all sinuated, 3.

3. Female obtusely carinated posteriorly; pale yellowish with a lateral black lunule on either side, 3, *segmentata* Fowl.

–. Female acutely carinated; marked about as in *Cyrtolobus*, 4, *læta* Godg.

1. **Vanduzea arquata** Say. Pl. 2, fig. 30.

Very abundant on locust trees from Ohio southward. The ground color varies from ferruginous to almost black, but always there is an oblique vitta on either side and a band close to the apex white. Walker's *Ceresa apicalis* seems to me to be very near this.

2. **Vanduzea vestita** Goding.

This species is smaller than *arquata*, has more prominent humeri and has the pronotum broader posteriorly and proportionately longer, reaching to the base of the apical areole. The males are black with a narrow transverse band before the apex, an oblique vitta on each lateral margin and sometimes a dorsal mark between them, white. Female larger, brown or ferruginous, becoming darker posteriorly and marked as in the male. I took this species in Colorado and the Cornell University collection has a series from Arizona.

3. **Vanduzea segmentata** Fowler.

Dorsum regularly but not greatly arcuated, not compressed as in *Cyrtolobus* and in a lesser degree than in *Vanduzea læta*; obtuse apex of the pronotum attaining the base of the transverse terminal areole of the elytra. Elytral venation very irregular but characteristic of this genus; the costal areole very narrow, coriaceous and punctured on the basal third with a few punctures scattered along the costal nervure beyond. Color pale fulvous yellow on the head and pronotum; breast, legs, base of the elytra and its apical areole dull chocolate brown. Sides of the pronotum with a half round fuscous mark, more or less distinct, on either side resting on the humeral angle anteriorly and including a few minute pale points; bordering this fuscous spot posteriorly is a white band which is slenderly outlined with brown behind. Extreme tip of the pronotum obscurely brown, faintly bordered with pale anteriorly. Length 5 mm.

The collection of Cornell University contains a good series of this species from Arizona, some of which are darker and are varied with brown on the head and metopidium. Prof. Wickham has sent me one female from Texas that is of a clearer yellow and is much larger than those from Arizona.

4. **Vanduzea læta** Goding. Pl. 2, fig. 31.

The Cornell University collection has a long series of this species that were taken in Arizona. Here the pronotum is carinated much as in *Cyrtolobus* and the markings are essentially those of that genus but the carina is less elevated. The anterior oblique vitta however is broader and curved about a segment of a dark semicircle, becoming evanescent anteriorly; frequently it is connected with the median spot where the appearance is that of an oblique band angled on either side as described by Dr. Goding. It is smaller than *segmentata* and is more acutely carinated.

5. **Vanduzea bajula** Goding. Pl. 2, fig. 32.

This species differs from its congeners in having the pronotal crest sinuated and in the female somewhat nodulose. Dr. Goding described this species as an *Evashmeadea:* the female as *bajula* and the male as *arizonensis.* That genus however is hardly distinct from *Cyrtolobus* and differs from *Vanduzea* in having three longitudinal nervures at the base of the elytra. The female is very pale yellow with a blackish lunule on either side and some darker marks on the metopidium and along the crest posteriorly. The marking on the metopidium forms a ray on either side and before the apex there is sometimes a paler vitta. The male is pale brown irrorated with lighter anteriorly, and posteriorly shows the characteristic *Cyrtolobus* marks in an abbreviated curved anterior pale vitta, a transverse vitta before the apex and a pale spot in the dorsal sinus. In the Cornell University collection is a long series from Arizona.

Genus Polyglypta Burmeister.

This genus of tropical Membracids is well represented in the fauna of Mexico and Central America. It may be distinguished by its slender depressed form and the long porrect anterior pronotal horn. One species has been reported from our territory.

Polyglypta dorsalis Burmeister.

This is well figured in the Biologia (pl. viii, fig 5.) It has been reported from Savannah by Fairmaire and from Texas by Provancher.

Genus Entylia Germar.

The synonomy of this genus has long been in an unsatisfactory condition. The older species have not been redescribed and Walker's numerous species are but poorly characterized. My material is too scant to allow of my working out our forms fully. In the following notes I have taken as my starting point Fairmaire's identification of *sinuata* Fabr. and *bactriana* Germ. I find in my collection three evidently distinct species: a smaller southern form with the face more pointed, smoother and more evenly punctured, the outer margin distinctly sinuated close to the eye, the tylus more heavily clothed with hairs and the dorsal margin of the pronotum uneven or eroded in places. This I have identified as *sinuata* Fabr. (Pl. 1, fig. 2). A second and larger southern species with a shorter and more evenly rounded face and a very high and falcate anterior pronotal crest which leans forward over the face and is oblique on its superior margin, I have determined as *concisa* Walker (Pl. 1, fig. 1). Our common large northern form has a larger and rougher face the edge of which is broadly but feebly sinuated along the sides and the dorsal margin of the pronotum is more even. This I identify as *bactriana* Germ. (Pl. 1, figs. 3,4). In all of these the dorsal notch is quite similar, with the prominences lower and less angular in the males.

I give at the end of this paper a list in which the synonomy of these three species is given as I believe it should stand. It is hardly possible that *reducta* Walker should be raised to specific rank although it seems to have a shorter face with the margins more regularly arcuated and not so much sinuated as in our other forms of *bactriana*. This synonomy follows very closely that given by Butler.

Genus Publilia Stal.

This genus was founded by Stal for those species of *Entylia* in which the dorsum is not raised in a distinct crest but is more or less sinuated. In this character however the fwo genera run together completely and I have been unable to find any good natural character to separate them. But it certainly is convenient to have a distinguishing name for these depressed forms and I prefer for the present to retain this and certain other genera founded entirely on the form of the pronotum. They might perhaps with propriety be reduced to the position of subgenera but that is an awkward arrangement that I think should be avoided when possible. Genera are not and never can be of equal rank and if by their use we can make our synoptical tables more comprehensible and our cabinet arrangement more natural I believe such use is justified. At any rate a tentative study like the present is no place to submerge such genera.

Dorsum straight or feebly arcuated, scarcely if at all sinuated; form more slender, 3, *modesta* Uhler.

Dorsum more elevated, obviously sinuated, 1.

1. Sides of the pronotum with longitudinal rugæ which become more or less reticulated along the dorsum, 1, *concava* Say.

–. Rugæ of the pronotum strong, irregularly reticulated over its whole surface, 2, *reticulata* VanD

1. **Publilia concava** Say.

A common and widely distributed species. In the female the dorsal carina is distinctly elevated at the highest point of the pronotum above the humeri, which is not the case in the male. The carinate lines on the pronotum run straight and parallel along the sides where they rarely fork, but anteriorly and along the dorsum they become more or less reticulated. The anterior edge of the head is almost rectilinear for a space next the eye then rounded about the apex, with the clypeus a little prominent. This species appears to have been redescribed as *Publilia grisea* by Buckton.

1. **Publilia concava** var. **nigridorsum** Goding.

This was described as a distinct species but it certainly is but a color variety of *concava*. It is black with the side of the pronotum broadly testaceous, In the large number of examples of this variety I have examined the only variation is in the width of the dorsal band. The characters of the head and pronotum are exactly those of *concava*,

2. **Publilia reticulata** n. sp. Pl. 1, fig. 5.

Closely allied to *concava* but with the surface of the pronotum reticulated with strong anastomosing rugæ in place of the four or five simple longitudinal carinæ found in that species. These rugæ give the surface a strongly corrugated or areolated appearance. Surface between the rugæ deeply punctured. Metopidium more vertical than in *concava*, the percurrent carina more elevated and the dorsal sinus somewhat deeper. Apical margin of the head distinctly sinuated next the eye, then very obtusely arcuated about the apex. Color blackish or fuscous speckled or blotched more or less with testaceous on the head and front of the pronotum as far as the dorsal sinus; and with a triangular whitish testaceous spot on the apical fourth of the lateral margin which may be prolonged somewhat along the margin anteriorly and indistinctly across the disk as an incomplete subapical vitta. Venter, tibiæ and tarsi pallid, the disk of the ventral segments more or less black. Length 4 mm.

Described from two female examples received from Prof. J. B. Smith, one of them labeled "Jamesburgh, N. J., June 24th", and the other "Kansas City, Mo., May 25th", and one male taken at Hot Springs, N. C., by Mrs. Slosson. I have more recently seen a good series taken at Hendersonville, N. C., by Prof. Franklin Sherman, Jr.

Buckton in his Monograph of the Membracidæ has described an insect as *Publilia grisea* n. sp. that would seem to have reticulated carinæ on the pronotum but both the description and figure are absolutely unrecognizable. With common consent this work of Buckton's should be entirely ignored by entomologists in all matters of nomenclature. The locating of his species without access to his types is a matter of pure guesswork. His work is in no sense scientific and I can see no reason why his species should be given standing in entomological literature.

3, **Publilia modesta** Uhler. Pl. 1, fig. 6.

This species is very distinct from both the preceding. It is proportionately longer and less elevated and the dorsal notch is scarcely indicated. The color is generally griseous or greenish-testaceous. In the darker examples there may be two oblique pale bands on the sides or there may be a broad dorsal brown band interrupted toward the apex by a transverse pale vitta. Goding's *Publilia bicinctura*, as pointed out by Gillette and Baker, is certainly only the grey color variety mentioned above showing two oblique pale lines. In this species the dorsal carina is not more elevated anteriorly in the female but the metopidium is higher and more vertical in that sex. I found this species abundant throughout Colorado and Utah where it seems to replace our eastern *concava*.

Subfamily Darnida Stal.

Of this southern group I find three genera and six species recorded as inhabiting the United States. *Hemiptycha longicornis* Fairmaire was accredited by its describer to "N. Am." but this is almost certainly an error and should have been Brazil as stated by Stal. *Aconophora lineosa* Walker is probably a *Platycotis*. It is very doubtful if *Aconophora* occurs at all within our territory. If found it will doubtless be from near the Mexican border. Our other genera may be distinguished as follows:

Head triangular; hardly shorter than the width between the eyes, 3, *Hypheus* Stal.

Head short, truncated, much broader between the eyes than long, 1.

1. Elytra with three nervures at base; at least one half exposed below the margin of the pronotum, 1, *Darnis* Fabr.

–. Elytra with two nervures at base, forked at about their middle; about one third of the elytra exposed below the sides of the pronotum, 2, *Stictopelta* Stal.

Darnis lateralis Fabr. has been reported from California, Dr. Goding has described three species of *Stictopelta* from Arizona and New Mexico and two species of *Hypheus* are known from Florida.

Subfamily Hoplophorida Stal.

Of this subfamily three genera and eight species have been recognized from our territory. The three genera may be distinguished as follows:

Posterior process of the pronotum attaining the apex of the elytra or at least much exceeding the tip of the abdomen, 1, *Umbonia* Burm.

Posterior process of the pronotum scarcely if at all exceeding the tip of the abdomen, 1.

1. Pronotum unarmed or armed before with a more or less porrect horn between the humeri, 2, *Platycotis* Stal.

–. Pronotum rounded before, behind the humeri armed with horn or rounded process, 3, *Lophopelta* Stal.

Lophopelta was described as a subgenus of *Platycotis* and generally is so listed but it has the same standing as such genera as *Telamona*, *Heliria* and *Glossonotus* and I prefer to list it as a genus in a faunal work such as this. Of Genus *Umbonia* two species have been accredited to Florida and the southern states, but I have seen only Mexican material of either.

Genus Platycotis Stal.

This genus has been a puzzle to me and I am still unable to satisfy myself in regard to the specific limitations necessary to be used here. Two so-called species are commonly met with from Maryland to Florida and west to California and Vancouver Island. Each of these is found in two forms in both sexes: with and without the porrect horn. In the females the pronotum is longer and more slender posteriorly and the humeri are more acute. These species are:

Platycotis sagittata Germar.

Germar described from Brazil the form with a porrect horn while Say described his *belligera* without the horn, from the eastern United States. In the males of both forms the croceous points form two longitudinal vittæ on either side. From the descriptions and figures of *vittata* Fabr. I can see no reason why it also should not be referred to the unarmed form of this species. *P. nigro-maculata* of Provancher (not *nigrolineata* as written by Goding) is another synonym of the unarmed form, while Walker's *Aconophora viridescens* and *guttifera* are redescriptions of the form with a horn. I have examples of this species from North Carolina and California and in the Cornell University collection are others from Arizona and Florida.

Platycotis quadrivittata Say.

The horned form of this species has been redescribed as *Hoplophora 4-lineata* by Germar and as *Aconophora porrecta* by Walker, while the unarmed form was redescribed as *Hoplophora lineata* by Fairmaire.

Two additional species of *Platycotis* from California have been described by Dr. Goding in volume three of Entomological News which are probably new if not forms of one species. They are still unknown to me. He described *P. minax* from a horned specimen and *P. asodalis* from an unarmed form.

Subfamily Membracida Stal.

KEY TO THE GENERA:

Head short, the base transverse and tumid, the small triangular apex much depressed; pronotum elongated, depressed, bisinuate behind; size small, 9, *Centrodontus* Godg.

Head flat or nearly so, the apical portion not abruptly depressed below the level of the base, 1.

1. Head distinctly trilobate at apex, the broad rounded clypeus produced for at least half its length before the line of the cheeks; pronotum elevated anteriorly in a slightly inclined angular process which is bifed at apex by the incised median carina; size small, 6, *Multareis* Godg.

–. Head long and rounded or truncated at apex; porrect process if any not bifed at apex, 2.

2. Pronotum much elevated, thin and foliaceous, the dorsal outline regularly rounded before, 1, *Membracis* Fabr.

–. Pronotum more or less elevated or obtusely rounded above, sometimes moderately foliaceous but in that case angled or produced in a crest anteriorly, 3.

3. Form oblong or elongated; pronotum more or less compressed laterally and furnished with a distinct dorsal carina, 4.

–. Form short or even subglobose, not at all compressed and without a distinct dorsal carina; surface roughly corrugated, 8, *Bolbonota* A. & S.

4. Pronotum with a long oblique anterior process, the posterior process little elevated, attaining the apex of the elytra, 10, *Philya* Walk.

–. Posterior process of the pronotum not attaining the apex of the elytra, 5.

5. Pronotum distinctly compressed elevated, produced anteriorly in a prominent, usually oblique, compressed process, 6.

–. Pronotum less compressed, the dorsal line angled anteriorly sometimes deeply sinuated or step-shaped posteriorly, 8.

6. Anterior pronotal process with a carina on either side that does not extend behind the humeri, 2, *Enchophyllum* A. & S.

–. Lateral carinæ of the anterior pronotal process attaining the middle of the posterior process, 7.

7. Lateral carinæ of the anterior process placed about equally distant from the upper and lower margins, the superior and inferior carinæ foliaceous, 4, *Enchenopa* A. & S.

–. Lateral carinæ of the anterior process placed near the superior margin, the inferior carina not foliaceous, 3, *Campylenchia* Stal.

8. Pronotum elevated anteriorly in an almost square hump, posteriorly deeply bisinuated so as to form two steps, 7, *Tylopelta* Fowler.

–. Pronotum produced in an oblique angle before, the dorsum more feebly bisinuate posteriorly, 5, *Leioscyta* Fowler.

Genus Membracis Fabr.

Membracis mexicana Guer. and *nigra* Oliv. have been reported from our territory; the former by its describer and the latter by Dr. Goding. Both were from California and the western states.

Genus Enchophyllum A. & S.

Dr. Goding credits *Enchophyllum (Phyllotropis) fasciatum* Fabr. to "N. Am." on my authority but just now I am unable to lay my hand on the reference or material quoted by me. I think it doubtful if it occurs within our territory.

Genus Campylenchia Stal.

Campylenchia curvata Fabr.

A very abundant species throughout the United States and Canada. It exhibits great variation in depth of coloring and some in the shape of the pronotal horn. In the male this horn is always much shorter than in the female. Say redescribed it as *Membracis latipes* and Walker has added at least five other synonyms.

Genus Enchenopa A. & S.

Dark ferruginous brown or piceous black; anterior process long and curved forward at apex; dorsal carina prominent posteriorly, whitish, usually interrupted behind the middle; inhabits eastern United States,
1, *binotata* Say.

Pale yellowish or testaceous yellow; anterior process straight, moderately elevated; dorsal carina not elevated posteriorly, bisinuate, pale with a dark median spot and tip; inhabits western states, 2, *permutata* V. D.

Enchenopa binotata Say.

Common and widely distributed in the United States and Canada. It varies much in the form of the pronotal horn but I cannot discover any characters that seem to be of specific value. *Enchenopa porrecta* Buckton and *brevis* Walker are doubtless synonyms of this species.

Enchenopa permutata n. sp.

Pale testaceous varied with darker on the sides and along the pronotal horn and marked with fuscous, sometimes obscurely, behind the middle of the dorsum and at the extreme tip of the pronotum; sternum and venter brown.

Pronotum anteriorly produced in an oblique compressed process obviously longer than wide at base, its apex narrower and obtusely rounded. Dorsum distinctly sinuated before the acute apex before which it is feebly arcuated on the fuscous dorsal spot. Lateral carinæ but little elevated on the sides of the anterior process, attaining the lateral margin at about its middle. Median carina of the metopidium becoming more broadly elevated or almost foliaceous on the anterior process where it is more prominent than in *binotata*. Length to tip of the pronotal horn 5 mm.

Described from 10 females taken by Prof. Wickham at St. George, Utah, in July, and two other females from Arizona in the Cornell University collection. This small pale species bears a close resemblance to *Leioscyta ferruginipennis* var. *testacea* V. D. and I formerly considered it the female of that species but recently I have examined a series of both sexes of the *Leioscyta* and believe this to be quite distinct. I am led to place it in *Enchenopa* by the presence of at least rudiments of two intermediate carinæ on the anterior base of the dorsal process. The elytral venation in these two genera agree entirely and in the form of the pronotal horn the present species is strictly intermediate. The name here used is one given it in MS by Dr. Uhler.

Genus Leioscyta Fowler.

Leioscyta ferruginipennis Goding.

I have seen no specimen that exactly agrees in color with the dark form described by Dr. Goding from California but at Grand Junction, Colorado, I took a maculated individual that is intermediate between that and the pale variety described below as variety *testacea* with which it seems to be specifically identical. The pronotum is of the same pale yellowish testaceous varied here however with fuscous. These marks form an indistinct transverse band behind the middle, an irregular mark along the lateral carinæ and a spot on the superior angle. The lower surface is blackish, the tibiæ are banded and the elytra are fuscous, becoming testaceous at base and whitish on the clavus and at apex.

Leioscyta ferruginipennis var. **testacea** n. var. Pl. 2, fig. 33.

Pale testaceous yellow with the tip and a slender mark on the dorsal carina anterior to this brown or blackish in some examples. Elytra testaceous varied with whitish at apex and across the middle. Pectus and abdomen tinged with ferruginous. Tibiæ faintly banded in some examples.

I believe this to be specifically identical with the dark form described by Dr. Goding but the examination of more extensive material may necessitate raising it to specific rank. This pale form was taken by Prof. Ball and myself at Rifle and Grand Junction, Colorado, Prof. Wickham has sent me specimens from St. George, Utah, and the Cornell University collection has one specimen from Arizona.

Leioscyta pallidipennis Stal.

In the Cornell University collection is one female from Arizona bearing the label "*Bolbonota difformis* Uhler", evidently a MS name, that I believe to be the female of this species. The type specimens were from Mexico. The present specimen has the pronotum more angled before, the posterior process longer and the head more rounded at apex than shown in the Biologia figure but these differences are probably sexual. If I am right in this determination Stal's *cornatula* is sufficiently distinct.

Genus Multareis Goding.

This genus may be distinguished from all its North American allies in having the anterior pronotal process transversely flattened and bilobed at apex. In one specimen the median carina is raised as it passes over the apex at the point of this reëntrant angle. Dr. Goding described this genus in the *Centrotida* but it almost certainly belongs to the *Membracida.* Unfortunately my material is too scant to allow of my dissecting a specimen to determine if it have a scutellum. The tibiæ are flattened but hardly foliaceous as in our other genera.

Multareis cornutus Goding. Pl. 2, fig. 37.

Dr. Goding described this species in 1895 from a pair taken in Panamint Valley, California. Prof. Wickham has very kindly given me a similar pair taken by him in St. George, Utah, in July.

Genus Tylopelta Fowler.

Tylopelta gibbera Stal. Pl. 2, fig. 34.

The Cornell University collection contains a long series of this insect from Arizona which was determined by Dr. Uhler as *Bolbonota carinata* Uhler, a MS name that was never published by him. Dr. Goding in his catalogue published in 1894 describes a species as *Tropidoscyta americana* which I believe is but a pale form of Stal's species and in this I am confirmed by his statement that "this species may be found in collections under the MS name *carinata.*" The descriptions by both Stal and Goding would apply equally well to this species and the next but Fowler's excellent figure in the Biologia leaves little doubt of its identity.

Tylopelta brevis n. sp. Pl. 2, fig. 35.

Closely allied to *gibbera* but proportionately shorter with the apical margin of the elytra less oblique. Front of the pronotum almost vertical with an acute median carina; its height about equal to the length of the horizontal superior edge of the anterior dorsal lobe. This anterior dorsal lobe when viewed from the side almost square. In *gibbera* this lobe is distinctly though feebly arcuated above. Apical process much shorter and heavier than in *gibbera*, attaining the tip of the elytral areoles. Elytra shorter, truncated and almost vertical at apex. Color dark castaneous varied with blackish in places; elytra blackish, the costal areole and nervures ferruginous, marked before the middle by a somewhat oblique transverse white vitta which does not attain the costa and is interrupted by the nervures; an irregular spot at apex of the costal areole, another before the apex, and an oblong one on the apical membrane near the inner angle white. Legs blackish with the tarsi pale. Length 3 mm.

Described from two females from Florida one of which was taken by Mrs. Slosson. This species is readily distinguished from *gibbera* by its shorter and more robust form. In this respect it is allied with *Bolbonota* but it has entirely the form of *Tylopelta* and must be referred to that genus. I have not yet seen the description of Fowler's *Bolbonota aurosericea* which he states was described from North America but this name was long since preöccupied by Stal for another species in this genus so should it prove to be not distinct from *brevis* this name will still be good.

Genus Bolbonota A. & S.

Dr. Goding states that *Bolbonota* (*Tubercunota*) *tuberculata* Fabr. is found in Florida, quoting Riley as authority. It would not be surprising if the species so determined were that described above as *Tylopelta brevis* instead of the South American *tuberculata* Fabr.

Genus Centrodontus Goding.

Centrodontus atlas Goding. Pl. 2, fig. 36.

The male of this species, of which I have received a series from Prof. Wickham which were taken at St. George, Utah, agrees exactly with the description of Dr. Goding's *Gargara atlas.* His description of genus *Centrodontus* however, founded purposely for this species, fails to correspond in several important particulars. He states that the head is "spindle shaped" whatever that may mean; that the feet are simple while here they are strongly flattened in the male, almost foliaceous in the female; and that the scutellum is bidentate at its extremity, with the posterior process of the pronotum lying between these teeth. In this insect there is no scutellum as I have learned by dissecting one of my specimens. I believe that my determination of the species is right and that Dr. Goding was misled by the pale alternations on the carinated margins of the posterior pronotal process. The male tibiæ if viewed from before would appear simple. I may add that the dorsal line of the pronotum is strongly bisinuate in the female.

Genus Philya Walker.

Philya ferruginosa Goding. Pl. 2, fig. 38.

The Cornell University collection contains a good series of this species that were taken in Arizona by Mr. H. K. Morrison. Dr. Uhler sent it out under the MS name *Enchenopa gracilis* but Dr. Goding described it under the present name in genus *Aechmorpha* Stal which Canon Fowler places as a synonym of the earlier *Philya* of Walker. *Aechmorpha californensis* Goding is still unknown to me.

Subfamily Centrotida Stal.

The *Centrotida* are but poorly represented in our North American fauna. I know of but five species representing as many genera, which have been reported or collected within our limits. A good synopsis of the American genera may be found in the Hemiptera Fabriciana, ii, pp. 47–49, and a later and more up to date table is in the Biologia, Homop. ii, pp. 146–148. As but one of our genera is included in Stal's table and two in Fowler's I have prepared a new one that may be of assistance to the beginner. Genus *Aethalion* has not yet been reported from our territory although it occurs in Mexico and the West Indies.

KEY TO THE GENERA:

Posterior process of the pronotum little if at all surpassing the scutellum; the anterior lobe without suprahumerals, 1, *Microcentrus* Stal.

Posterior process of the pronotum distinctly surpassing the scutellum, 1.

1. Pronotum with large conspicuous suprahumerals, 2.

–. Pronotum with small spine-like suprahumerals at least in the female; form broad oval, 4, *Tylocentrus* V. D.

2. Suprahumerals long and slender, trete or triquetrous; posterior process long triangular, 3, *Platycentrus* Stal.

–. Suprahumerals broad and flattened, little longer than broad, and inclined outward and forward, 2, *Centruchoides* Fowl.

Genus *Tuberculocentrus* of Goding (Can. Ent. xxvii, p. 275, 1895) is still unknown to me and there are no characters in his description by which I can place it in a dichotomus table. It seems to be closely related to *Centrodontus* and in that case must be placed in subfamily *Membracida.*

Genus Microcentrus Stal.

Microcentrus caryæ Fitch.

Common and widely distributed throughout the eastern United States and Canada. Canon Fowler in the Biologia established genus *Phaulocentrus* and includes in it Fitches *Uroxiphus caryœ*, apparently overlooking the fact that Stal had already founded genus *Microcentrus* on this same species. Fowler's genus seems to be a straight synonym of that of Stal.

Genus Centruchoides Fowler.

Centruchoides perdita A. & S.

This insect was described by Amyot and Serville as a *Ledra* and later by Goding as *Centruchus Liebecki.* Fowler in the Biologia founds genus *Centruchoides* for a closely allied species from Panama differing from this in having the posterior process of the pronotum longer, reaching almost to the apex of the abdomen. In *perdita* this process does not attain the middle of the abdomen, but *perdita* evidently pertains to Fowler's genus the characters of which should be so modified as to admit it.

Genus Platycentrus Stal.

Platycentrus acuticornis Stal.

In the Cornell University lot are two good typical examples of this species from Arizona and another with the horns shorter and more depressed, the latter bearing the MS name *Diaperops furcatus* Uhler. Another specimen from California has the horns still shorter and stouter, the pronotal surface more castaneous with less conspicuous rugæ, and the tibiæ darker at apex without the pale bands. This specimen is probably near the form from Jalisco mentioned in the Biologia. I cannot distinguish it specifically from *acuticornis* with the material in hand.

Genus Tylocentrus n. gen.

Allied to *Sphærocentrus* Fowler. Short, robust; pronotum but little elevated, subglobose, depressed and rounded before. Humeri subangularly prominent, the rounding sides above the humeri armed in the female by a short, abrupt, and acute suprahumeral spine, in the male unarmed; Posterior process reaching to about the middle of the abdomen, abruptly narrowed at base, then parallel for a space, its apex acute, nearly one half the width of the scutellum. Scutellum broad, apparently bidentate at apex. Elytra free, coriaceous at base, areoles beyond the middle irregular, with more or less complete anastomosing veinlets; discal areoles apparently three, apical four. Head short, transverse, the clypeus abruptly protracted for most of its length beyond the line of the cheeks; obviously widened and in the male recurved at apex. Tibiæ simple.

This genus is proportionately shorter that *Sphærocentrus*. The posterior process is much shorter and is appressed to the surface of the scutellum, and the dorsal line when viewed from the side is almost straight or at most but moderately sinuated. From *Tuberculocentrus* Goding it differs in its broader form, the presence of suprahumeral horns in the female of the type species at least, the shorter and less sinuated posterior process of the pronotum, and in the less strongly reticulated elytra.

Tylocentrus reticulatus n. sp. Pl. 2, figs. 39, 40.

Broad oval, tapering posteriorly. Face flat, about twice broader than long, the occipital and basal margins behind the ocelli a little elevated; surface closely and evenly punctured; anterior edge of the cheeks feebly arcuated; clypeus produced beyond the line of the cheeks about as far as the distance between the ocelli. Pronotum closely and evenly punctured, with a distinct but not strong median carina; anterior margin of the metopidium prominent, the surface above each eye with a large callous; suprahumerals viewed from before horizontal or nearly so, reaching the line of the humeral angles; exposed sides of the scutellum filling in the sinus of the posterior pronotal process. Tibiæ flattened but not at all foliaceous.

Color variable, usually, fulvotestaceous shading to ferruginous on the face and anterior margin of the pronotum; Suprahumerals, a lozenge shaped mark on the rounded disk of the pronotum, tip of its posterior process and disk of the exposed portion of the scutellum ferruginous in pale examples, fuscous or black in dark examples. Sides of the face and callosities sometimes blackish; anterior margin of the cheeks, clypeus and apical angles of the scutellum pale. Basal one third of the elytra testaceous shading to ferruginous or blackish at base; apical two thirds whitish hyaline with the nervures and a costal cloud next the pale basal portion ferruginous or fuscous. Beneath pale, more or less white-pruinose; femora, three bands on the tibiæ and the pygofers of the female ferruginous or blackish. The male is more strongly colored with the ferruginous marks mostly black; the face black with the anterior margins and median line pale; the coriaceous portion of the elytra paler posteriorly imparting the appearance of a transverse band. Length 4–5½ mm.

Described from one male in the Cornell University collection and five females taken at St. George and Leeds, Utah, in July, by Prof. Wickham. The male from Arizona is much smaller and wants the suprahumeral spines, and may represent a distinct species although I consider this altogether unlikely. The Arizona male bears the MS name *Tylophorus ramosus* Uhler and in case it should prove to be distinct the name here applied by me should follow the female.

NOTES AND CORRECTIONS.

Page 38, line 8. For *May* 1908, read *April* 1908.

Page 39, line 7 from bottom. For *1803* read *1893*.

Page 39, line 4 from bottom. For *albidospara* read *albidosparsa*.

Page 70, line 1. For *Telamona cucullata* n. sp. read *Telamona projecta* Butler.

(Note: On further examination I am convinced that my *Telamona cucullata* described on page 70 is the same as *Telamona projecta* of Butler, described without locality in Cistula Entomologica, ii, p. 221, pl. 3, fig. 12. I was careless in being misled by Butler's erroneous reference to fig. 11 in place of figure 12 and entirely overlooked the latter figure.)

SYSTEMATIC INDEX.

This index includes all the Membracidæ known to me to inhabit America north of Mexico. Synonyms are in italics; names cited in error are preceded by ‖ Page numbers refer to the present paper.

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39. “ uniformis Fairm. Front view.
40. Stictocephala diminuta Van D. Last ventral seg. of female.

PLATE I

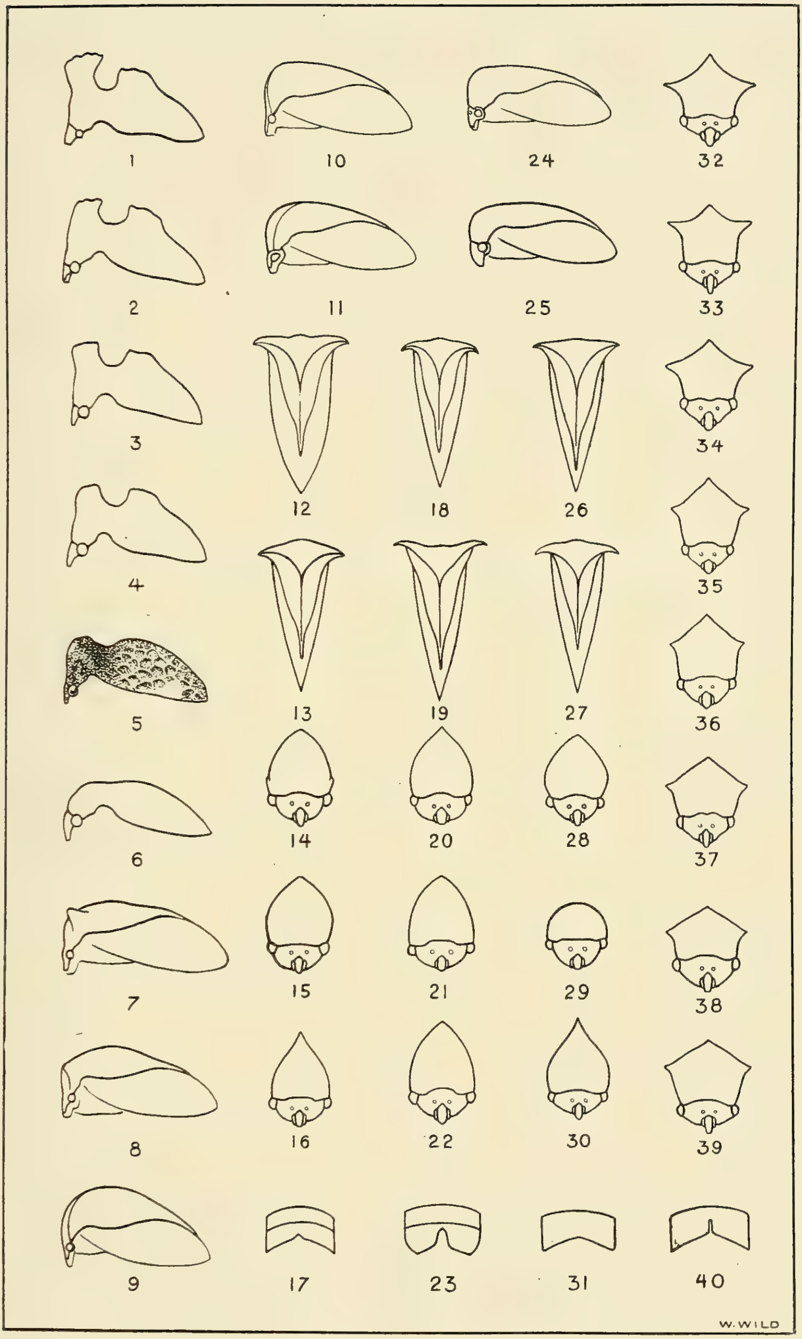
W. WILD

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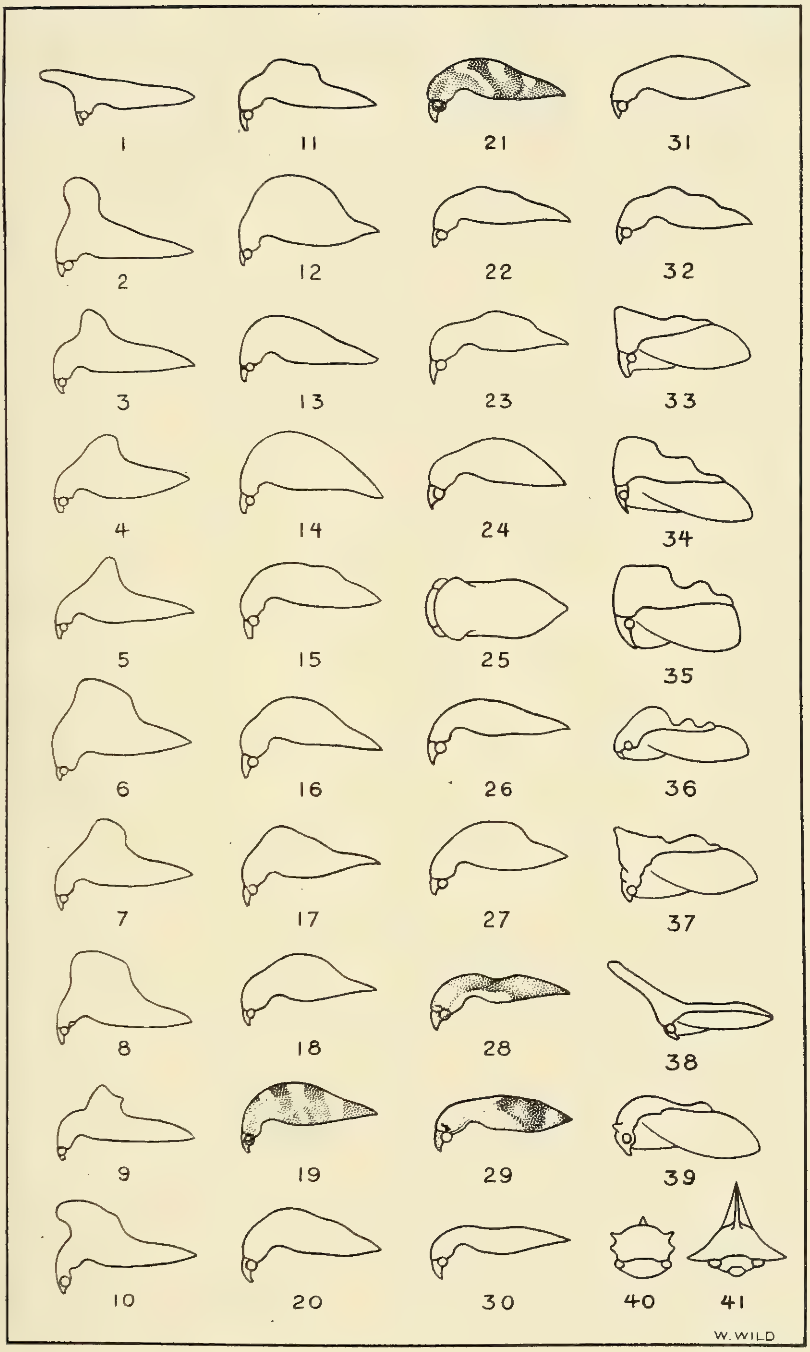
PLATE II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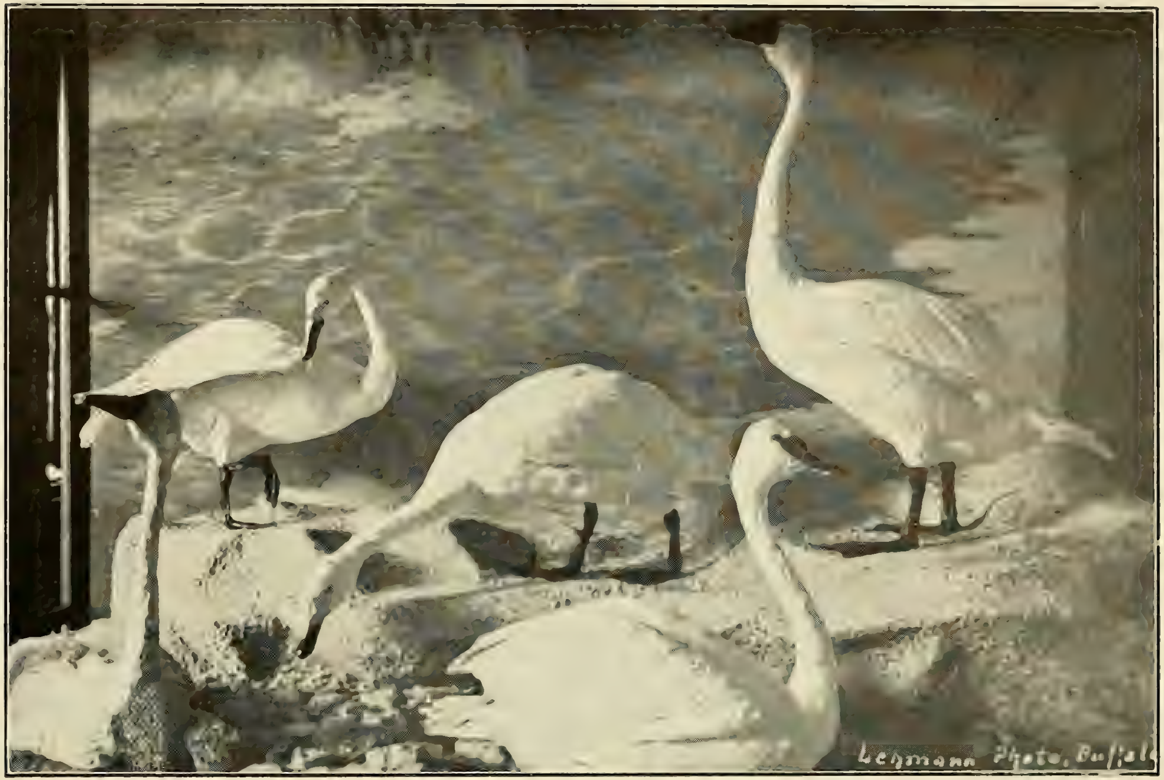


GROUP OF WHISTLING SWANS

BULLETIN
of the
Buffalo Society of Natural Sciences

VOLUME IX. No. 2

A Group of Whistling Swans.

(*See Frontispiece*)

The frontispiece shows an interesting group of the Whistling Swans, Olor columbianus, mounted for the Buffalo Society of Natural Sciences and displayed with its collections.

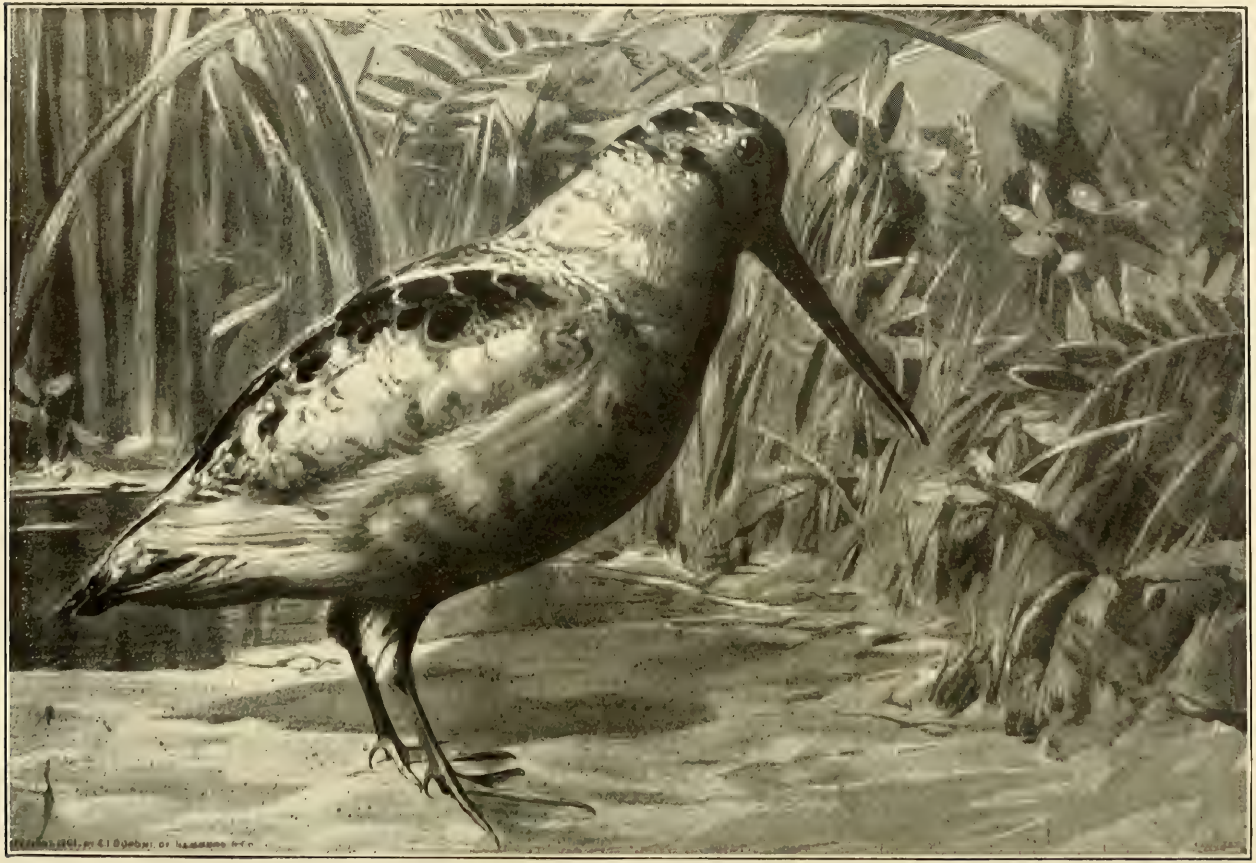
These beautiful wild birds met an untimely death in the early part of March, 1908, when on their long migration to their breeding grounds in the far north. Exhausted and hungry they dropped for rest and food in the wide expanse of the Niagara River above the falls. The weather being at that time very hazy, they drifted into the rapids and were carried over the Horseshoe Fall to their destruction. Many were killed outright and the others were so hurt and maimed that they could not recover. It is estimated by Mr. Ottomar Reinecke who secured these specimens for the Society that about 102 met their death at that time. A detailed account of this occurrence was published in our last bulletin. In the spring of 1906 sixteen and in 1907 six of these wild swans were killed in the same manner. In the early part of November 1908 four more met their death at the Falls while migrating southward and in the following month two late travellers ended their journey there.

Notes on The American Woodcock

By Ottomar Reinecke,
Buffalo, N. Y.

The American Woodcock, *philohela minor*, occurs in the vicinity of Buffalo as a fairly common summer resident. It arrives from the south in a normal season about the last of March and usually within the week begins nesting. Aside from the barred and great horned owls which are permanent resi-

From Photo by James Savage



AMERICAN WOODCOCK, PHILOHELA MINOR.

dents, it is one of the earliest of our birds to nest, sharing honors in this respect with the prairie horned lark, bluebird, killdeer and migrant shrike.

The nesting site is most frequently chosen among bushes and second growth in pastures or along the edge of the woods. The nest is often placed at the root of a bush or beside a log and is a mere depression in the ground lined with a few dry leaves and grasses. The number of eggs in a nest is nearly always four; on one occasion only did we see five, and the complement is to be found the second week of April. The eggs show considerable variation in size and color. They measure from 1.47x1.12 to 1.65x1.33, and are "brownish clay-color, more buffy or more grayish, with numberless chocolate brown surface markings and stone gray shell spots." (Coues.)

From Photo by James Savage

I found my first nest of the woodcock on high ground in what has since become Forest Lawn Cemetery, Buffalo, April 16th, 1864, on the edge of a snowbank. The parent bird must have been killed by an owl, as its feathers were lying near the nest. The eggs are still to be seen in my collection and have well preserved their delicate color.

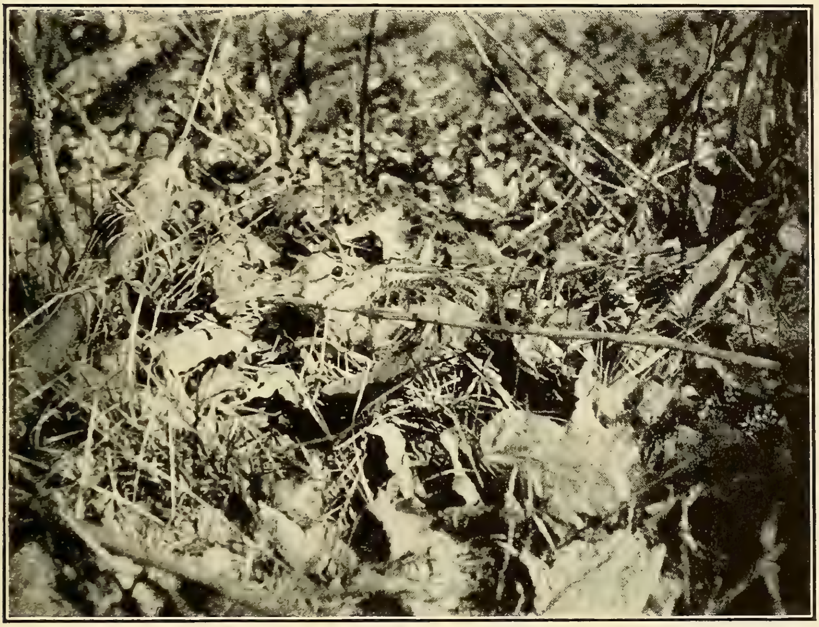
While snipe-shooting April 9th, 1901 my son, Edward Reinecke, found a woodcock's nest with the female bird on her eggs. Having heard of their very close setting, he crept up cautiously and with a short slender twig, raised the bird's bill up and down until finally she flew from her nest which contained three beautiful eggs. The thought occurred to him that this was a chance to secure a picture. Three days later he again visited the place accompanied by Mr. William Wild, the artist, whose painting of Ruffed Grouse, exhibited last year at the Albright Art Gallery, attracted much attention. They found the female again on the nest. Mr. Wild approached her as closely as possible and resting one knee on the ground made a sketch of the bird as shown in our cut. While working at this, some involuntary movement occasioned by his strained position, frightened the bird from her nest, in which to their surprise five eggs were displayed of which a sketch was made which is here reproduced. I had never before heard of so large

From Photo by James Savage

WOODCOCK ON NEST, from sketch by WM. WILD.

a clutch of woodcock eggs in one setting and these now adorn my collection. They are very finely marked and are the envy of every collector who has seen them.

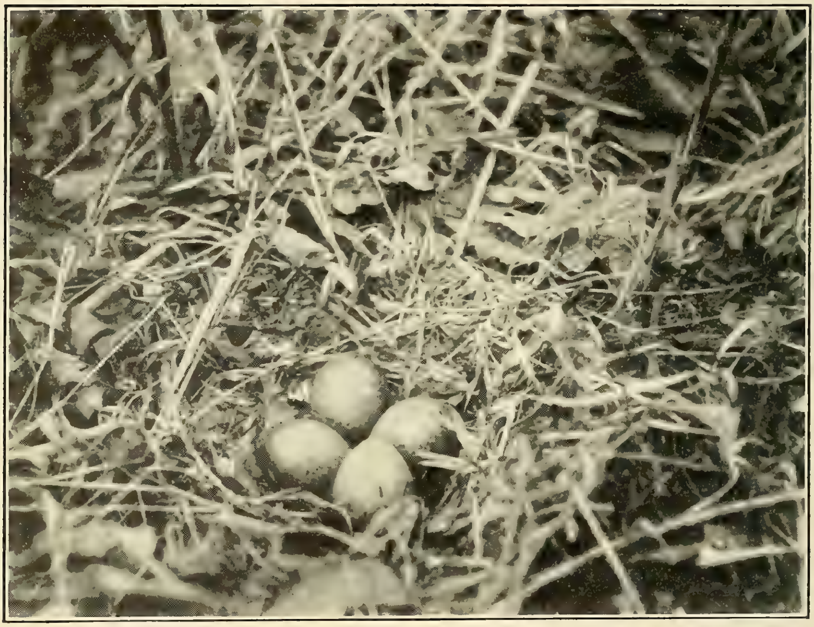
During the breeding season the soaring flight of these birds is an interesting sight and one that comparatively few observers have been privileged to witness. Loitering in their favorite haunts at dusk one's attention is first attracted by a rather harsh call note — a sort of a squawk, uttered by the bird while on the ground. By going cautiously in the direction of the call, making advances only when the bird is in the air, it is possible to approach within a few feet of the spot from which it starts and to which it will return after each flight. After sweeping along the ground for about forty yards it ascends spirally into the air until almost out of sight in the increasing darkness. It continues to soar for a short time and then suddenly drops down in a zig zag course to the spot from which it started. It then struts about and calls for a few minutes and is off again on another flight.



From Photo by James Savage

It requires an experienced eye to detect the brooding bird as its plumage blends so naturally with the surroundings. How deceptively the colors of the bird harmonize with those of the ground about the nest is well illustrated by the picture on page 145.

Sometimes the weather is very unfavorable for them as in the spring of 1904 when we found the Woodcock in hard luck. In our locality the thirteenth of April is usually the time to look for full sets of Woodcock's eggs. That year was no exception to the rule, although at the time referred to we had been visited by a heavy snowfall which covered the ground to the depth of eight inches. The snow had been partially melted by the sun, but was frozen hard during the ensuing night. Two days later another snow storm occurred. The next morning found us on the ground, which is an ideal locality for the nesting of this bird. The ground was then completely covered with about five inches of crusted snow. In company with several friends we immediately began our search for the woodcock. We soon found the tracks of a pair where they had been feeding or trying to find food around partly frozen water holes.



From Photo by James Savage

WOODCOCK'S NEST WITH EGGS, from sketch by WM. WILD.

We flushed the birds and began looking the snow covered ground over carefully for the nest. We found none in that vicinity; but following the back tracks of a single bird, which evidently were made the previous day, we came to the spot, at least a quarter of a mile distant, where the bird had started on its walk to the water holes. On examining the place nothing but a slight depression was found, appearing somewhat dirtier than the otherwise clean snow.

From Photo by Ed. Reinecke

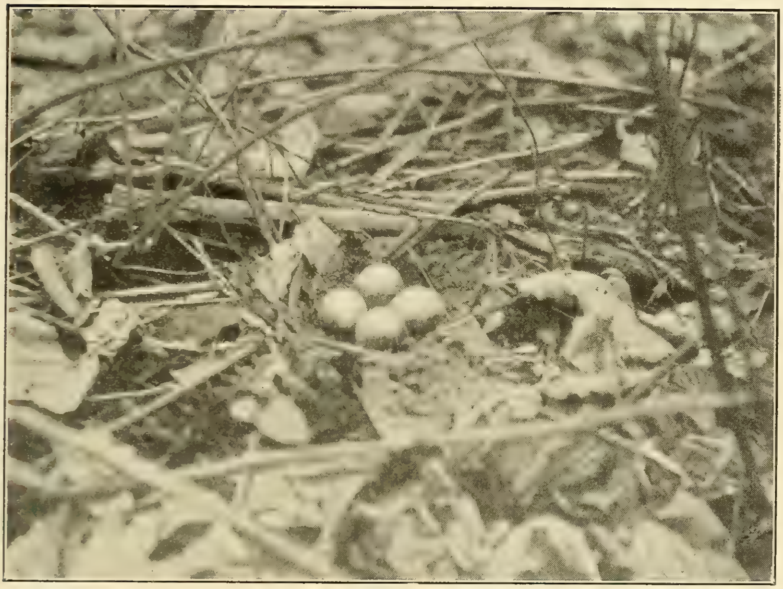
We were beginning to think that the bird had taken this place, in a small clump of bushes as a refuge from the snow storms, when it was suggested that perhaps after all, the nest might be under the hard frozen snow. This was no sooner suggested than we were down on our knees, taking turns at melting the snow with our breath. After a few minutes we were rewarded by the sight of one egg, and continuing our efforts we found a fine set of four eggs, the first lying directly in the middle and on top of the three other eggs, and being separated from them by a layer of at least an inch of snow. From this I take it that when the first snow storm came, the bird had laid only three eggs and had found difficulty in keeping on them for any great length of time. The woodcock lives on worms from the soft marshy ground, and consequently she could not remain a long time on the eggs; or possibly the large amount of falling snow made the bird continually shift her position until by this constant moving, the eggs were covered with snow; then the next day the other egg was deposited as before mentioned. After this the second snow-fall occurred which the bird could not withstand and so finally deserted nest and eggs. We found several more nests in the same way on that day, and in each case the eggs were found as described.

From Photo by Ed. Reinecke

In the spring of 1908 we were fortunate in securing good photographs of the woodcock for in its breeding time this wary bird loses its shyness, as will be shown by the illustrations.

Having located a bird on the nest, we first took the picture on page 137. No disturbance had been made in the surroundings. Then my son crept up towards the nest and cut away some twigs, dry grass and herbage as shown in the picture on page 138.

After this he crept nearer and with a slender twig three feet long raised the bill up and down, as shown on page 141 and finally getting closer to the bird, took hold of its bill with his fingers when the woodcock flushed from the nest, exposing a fine set of four eggs. The picture on page 134 shows a typical nesting site and the character of its surroundings with the author pointing to a nest containing four eggs. The latter were photographed as shown on page 142.



From Photo by Ed. Reinecke

After a while we went on and to our astonishment found a pair of woodcock strutting around us, and not more than five to ten feet away. They reminded us of a turkey cock as they went along with heads erect, tails spread vertically, wings drooping and bills pointing downward close to their breasts. We used every effort to find their nests without success. What a difference in the fall of the year, when the sportsman is after them.

The woodcock was formerly found in large numbers in the vicinity of Buffalo, but of late years it has been growing scarcer each season and with the wood duck is regarded by some ornithologists as being doomed to early extermination. It is said that the European woodcock, or woodsnipe, as it is there called, is now rarely taken by gunners of the old world. Reasons for the diminishing number of woodcock are found in the cutting off of the woods and the draining of their feeding grounds. But the woodcock is a game bird par excellence and the chief cause of its growing scarcity is the persistence with which it is pursued by sportsmen.

When the birds were plentiful and gunners few, the season opened on July 4th, and continued until the birds migrated to the southward. Then it was possible for a good shot to bag twenty to thirty woodcock in a day. Summer shooting was very destructive as the birds are then congregated in the relatively few wet woodlands congenial to their habits of feeding.

Now that the sale of the birds is prohibited, the shooting season restricted to the months of October and November and a bag limit fixed at six birds per gun per day, conditions hereabouts are likely to improve somewhat in spite of the fact that during the year 1908 hunting licenses to the number of 4058 were issued to residents of Erie County. But something should be done to afford protection to the birds when wintering in the southern states and it is to be hoped that success will soon crown the efforts now being made to secure better protection and some uniformity in the provisions of the game laws of the several states.

Acknowledgements are due to Wr. William Wild for permission to use his sketches and also to Mr. James Savage for the use of several of his photographs.

OTTOMAR REINECKE.

Observations on some Hemiptera

taken in Florida in the spring of 1908

By Edward P. VanDuzee

In the present paper I propose to enumerate the Hemiptera taken by me during a four week's collecting trip in Florida in the months of April and May 1908. To the locality notes given under each species I have added synonymical and miscellaneous observations on many of the forms and descriptions of a few new genera and species. Without question Florida has always been a favorite collecting ground for the insect hunter and many species have been credited to that state in the descriptive works of the earlier entomologists, but so far as the Hemiptera are concerned no systematic work has been done there until quite recently. The pioneer worker in this field was Mrs. Annie Trumbull Slosson who for a number of years past has spent a considerable proportion of her winters collecting insects at various localities in that state. She is an enthusiastic and diligent worker and has brought to light a large number of new species, some of them of great interest and rarity. I had hoped she could be induced to publish a list of her captures in the Hemiptera prior to the appearance of this paper but other engagements have rendered this impossible, so she has very kindly sent me a list of the species taken by her with full permission to make such use of these notes as I wished; a privilege of which I have availed myself many times in the following pages. Mrs. Slosson's list includes many forms not taken by me and it is hoped that she will later give us a report on these with annotations on other forms which, owing to the hasty and superficial nature of my work in Florida, I was obliged to include with little more than a notice of their capture.

On the present trip I was accompanied by my brother Millard C. VanDuzee who was collecting the Hymenoptera, Diptera and Coleoptera, while my time was almost entirely devoted to the acquisition of the Hemiptera. I give our itinerary as a help in studying the faunal relations of the various genera and species.

Our first stop was at Crescent City situated between Crescent Lake and Lake Stella in one of the most fertile portions of the state. Here we worked from April 19th to the 25th, mostly on the borders of weeds and bushes or the grassy and weedy flats along the margins of these two lakes. Mr. F. G. Lasier very kindly gave us free access to the estate of the late H. G. Hubbard and later took us to the Hubbard farms on the prairies along Haw Creek about nine miles by water from Crescent City. There we found an interesting insect fauna quite different from that at Crescent City. On the 25th we left for Sanford, stopping for an hour's collecting about the station at Crescent City Junction. We reached Sanford in the afternoon and worked until dark along the marshy shores of Lake Monroe to the south of the railroad station. On the 26th we worked on and about one of the "palmetto hummocks" on what is there called the "Celery grounds". This hummock adjoined the lake shore just north of the railroad station and proved to be one of the best collecting grounds we found in the state. The following morning we worked in the open fields to the southwest of the village until driven in by the rain, proceeding in the afternoon to Tampa where we arrived early in the evening. On the 28th we collected, with excellent success, at St. Petersburg along the marshy shores of Tampa Bay south of the boat landing. That same evening we went on to Clearwater where we took some good insects under the electric lights. The next day we collected near the village in the forenoon and in the afternoon drove over to Sevenoaks to the home of Mr. R. D. Hoyt, who entertained us very pleasantly for two or three days. Here we worked on his farms and south through the open pine woods to Bay View and north to Green Springs and Phillippi's Mound. About this mound we found a decidedly different vegetation and many peculiar insects. On May 2d we took an early boat to Tampa and spent the afternoon collecting on the barren fields east of the city. Here there was a moderate growth of a broad leaved oak, the first we had found in Florida, and on this I expected to take some good Membracids but was only partially successful. From Tampa my brother started homeward while I went on to Ft. Myer where I collected on the 4th and

5th and then proceeded to Estero, a drive of 16 miles farther south through an almost pathless pine forest. At Estero I was very kindly and pleasantly entertained for a week by the Koreshan Unity as the guest of my cousin Junius B. VanDuzee. Here the country was comparatively new and the conditions for collecting by no means ideal but the fauna was quite different from that farther north and the results of my work proved in the highest degree satisfactory. At this place there was a large intermixture of West Indian forms and I found this to be especially the case on Estero Island at the mouth of Estero River. Along this gulf coast and on the outlying islands there is a considerable growth of subtropical vegetation of which the mangroves and cocoanut palms form perhaps the best index, and with this vegetation is found the subtropical fauna which extends as far north at least as Sanibel Island at the mouth of the Caloosahatchee.

The physical features of Florida are by no means encouraging to the collector first passing across the state. To him almost the entire state would seem to be one interminable pine barren; a nearly dead level of sand covered with an open forest of the tall slender trees of the long-leaved pine and overgrown below with the tangled stems of the low palmetto, or in places covered with a sparse growth of a long wiry grass intermixed with low huckleberry and other small bushes and weeds. A more careful inspection will however show that the conditions are by no means so monotonous and that frequent local variations of soil and humidity produce a varied vegetation on which subsists a really very rich Carolinian and subtropical fauna. The numerous tidal streams and lakes are bordered by a heavy growth of cypress, water and live oaks, and other deciduous trees which are frequently festooned with the spanish moss. The pine barrens are broken by "cypress swamps" and "palmetto hummocks" and across the middle of the state especially between Orlando and Lakeland, there are slightly elevated ridges clothed with broad leaved oaks and other vegetation quite distinct from that of the pine barrens. The fauna of the shore marshes is characteristic and the open prairie country along Haw Creek has its own peculiar fauna, and even in the monotonous pine forests we find a much greater variety of insect life than one would think possible.

A careful study of the insects herein enumerated has been somewhat of a surprise to me in that it indicates a different origin for the fauna of this state than I had anticipated. The Hemiptera as found by me point to four distinct sources of origin. First and most generally distributed is the Carolinian fauna which seems to have had its center of distribution in the foot hills of northern Georgia and the western portion of the Carolinas. This fauna has evidently spread southward over the low flat country of southeastern Georgia and Florida but south of Tampa forms but a small element in the insect life of the state. Perhaps second in importance is the intermixture of the West Indian fauna which is a conspicuous element at the southern end of the state and spreads northward nearly or quite to the middle of the state, at least along the coasts. A third and relatively important group of forms constitutes what might be termed a native or Floridian fauna which seems to have originated in this state, probably from an intermixture of the two faunas already mentioned, and fostered perhaps by the great extent of the unusual physical conditions found on this peninsula. The fourth element of the fauna is composed of stragglers from the rich faunas of Mexico and Texas; widely distributed species which have followed the gulf coast and have found the conditions here favorable for their preservation. Finally a few species were found which are almost universally distributed in North America. My knowledge of the Hemipterous fauna of our southern and southwestern states is still too meagre for me to attempt to draw the line closely between these elements of the Floridian fauna but the present material is sufficient to enable me to distinguish them quite clearly, and in a rough way to indicate their extent.

This collecting trip was undertaken partially in the interest of the Buffalo Society of Natural Sciences and to one of the directors of this society, Mr. Ottomar Reinecke, I am much indebted for his continued interest and encouragement in planning and carrying it through. I am also under obligations to the kind friends already mentioned whom I met in Florida and who did much to make my trip pleasant and profitable, but I am especially indebted to Mrs. Annie Trumbull Slosson for the loan of many of her most interesting Florida captures which I needed for comparison and study, and to Dr. W. L. Distant, Mr. Otto Heidemann, Mr. J. R. de la Torre Bueno, Prof. Herbert Osborn and Dr. E. D. Ball who have very kindly compared certain of the species taken by me with types in their posession, and for assistance in the determination of others.

At the end of this paper I add a brief summary of the number of genera and species taken, with an index to those which are here described as new.

Family Scutelleridæ.

1. **Chelysoma guttatum** H. S.

I swept one pair of this species from rank vegetation on the borders of the tidal marshes along the Caloosahatchee at Ft. Myers.

2. **Diolcus chrysorrhoeus** Fabr.

One fully colored individual was taken from bushes growing about the Phillippi Mound at Green Springs.

3. **Stethaulax** sp.

One specimen was beaten from the bushes growing along the southern shores of Lake Stella at Crescent City.

4. **Sphyrocoris obliquus** Germ.

Several examples were taken at Ft. Myers and Estero on rank vegetation. These represent both sexes and exhibit the usual variation in color markings.

5. **Homœmus grammicus** Wolff.

Apparently rare. Single specimens were taken at Crescent City, Sanford, Sevenoaks and Estero. Mrs. Slosson has taken it at Charlotte Harbor and Jacksonville.

6. **Camirus porosus** Germar.

I swept one example from the parched sparse vegetation in the open pine woods at Estero and Mrs. Slosson has found it at Biscayne Bay.

Family Thyreocoridæ.

7. **Thyreocoris unicolor** P. B.

I took scattering examples of this large species at Crescent City, Sanford, Clearwater and Ft. Myers. These specimens differ in no respect from those we find in the northern states.

8. **Thyreocoris lateralis** Fabricius.

Common and widely distributed in Florida. In a few examples the pale border to the elytra is much reduced or interrupted and at times may be entirely absent as recorded by Dr. Uhler. Prof. Wickham has recently sent me a specimen taken by him at Apipulco, Mexico. This is the species described by me as *Gillettii* in 1894. Elsewhere I have given my reasons for changing this determination.

9. **Thyreocoris pulicarius** Germar.

Taken in abundance everywhere I collected in Florida. This seems quite distinct from the larger northern form I have called *marginellus* Dallas. It may best be distinguished from that species by the more produced head, the margins of which are much more deeply sinuated before the eyes, and by the apex being more convex transversely. The whole surface of the head is also more closely and coarsely punctured.

Family Cydnidæ.

10. **Cyrtomenus mirabilis** Perty.

This large Cydnid was not uncommon about the electric lights at Clearwater on the evening of April 28th. We did not take it elsewhere.

11. **Geotomus robustus** Uhler.

Two examples swept from a weedy field at Tampa.

12. **Amnestus pusillus** Uhler.

Of this tiny species I took a single specimen while sweeping the dry prairies at Haw Creek near Crescent City.

Family Pentatomidæ.

13. **Brochymena arborea** Say.

Taken at Crescent City and Sanford.

14. **Trichopepla semivittata** Say.

Crescent City; one example.

15. **Pentatoma saucia** Say.

We swept a few specimens of this species from the tall marsh grasses on the shore at St. Petersburg. They were accompanied by their young.

16. **Mormidea lugens** Fabricius.

Common everywhere we collected.

17. **Oebalus pugnax** Fabricius.

Taken occasionally at all stations.

18. **Euschistus servus** Say.

Common everywhere in Florida. These present considerable variation in size, color and form of the humeri.

19. **Euschistus ictericus** Linneus.

I took a few examples at Crescent City, Sanford and Ft. Myers. In most of these the humeri are much more acute than in our northern specimens.

20. **Euschistus tristigmus** Say.

Sanford May 6th; a single example of the variety with acute humeri.

21. **Euschistus bifibulus** P. B.

Taken occasionally at Crescent City, Sanford and Estero. I have recently seen specimens from Texas.

22. **Euschistus crassus** Dallas.

I took this species at Sanford only. It seems to be rare.

23. **Proxys punctulatus** P. B.

One example taken at Sanford.

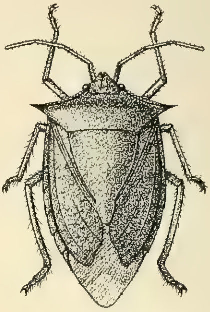
24. **Hymenarcys nervosa** Say.

A single specimen was swept from weeds adjoining a garden at Ft. Myers. This is a little larger and darker than examples in my collection from farther north.

25. **Thyanta custator** Fabricius.

Found at all points where I collected. Most of these show the red band on the pronotum and the black points on the edge of the connexivum but the humeri are obtuse and I believe they belong here rather than with *perditor*.

26. **Loxa florida** n. sp.



LOXA FLORIDA

Form of *deducta* Walker but larger: smaller than *flavicollis* with a longer pronotum, and humeri which do not point at all forward. Head apparently impunctate, furnished however with a few minute uncolored punctures; transverse rugæ very distinct behind the line of the antennæ; cheeks surpassing the tylus by about their own width at that point, rather obtuse at apex, their outer margins rectilinear; smooth area between the eye and ocellus unusually large, nearly orbicular, reaching the line of the inner margin of the ocellus. Pronotum as in *affinis* and *deducta*, proportionately longer than in *flavicollis* and *pallida;* the humeri as in *deducta*, shorter than in *flavicollis* but longer than in *affinis*, very acute, pointing outward and a little upward, not at all forward as they do in *flavicollis;* Surface of pronotum very regularly and evenly covered with transverse lines of fine brown punctures between broken transverse rugæ; crenulations of the lateral margins acute, smaller and more regular than in *flavicollis*. Elytra finely and evenly punctured; apical margin as in *deducta*, more acute and less sinuated apically than in *flavicollis;* membrane long, rather sparsely dotted with green. The pale calloused points are, as in *affinis*, fairly distinct on the elytra, less so on the scutellum and hardly distinguished on the pronotum. Disk of the elytra wanting the round pale discal point seen in *affinis*. Basal joint of the antennæ attaining the apex of the head, third a little longer than the second, fourth still longer. Rostrum a little surpassing the third ventral segment; second and third ventral segments feebly sulcate; fourth and fifth equal, about two thirds the length of the two preceding, hind edge of the fifth feebly angled at the middle, sixth very long, polished and brownish on the disk, its hind edge longitudinally striate and deeply and roundedly excavated; hind angles short, subacute. Genital segment long, exceeding the sixth segment by half of its length, its apex deeply and broadly emarginate as far as the middle, the sides of this sinus nearly rectilinear and having its fundus and apical angles obtuse.

Color clear light green with the narrow margins paler, bordered within by a rufous line, the punctures rufous brown. Antennæ and legs greenish testaceous tinged with brown in places. Lower surface paler with sparse concolorous punctures omitting the disk of the venter and pleural pieces as in the allied species. Length to tip of the membrane 21 mm.

Described from one male taken from an orange tree on the Hubbard estate at Crescent City and one female taken by Mrs. Slosson at Biscayne Bay. This species is unquestionably distinct from any other known to me. It is however very close to *invaria* Walker but the rostrum is shorter and the ventral sulcus is abbreviated, affecting the first and second segments only.

I have in my collection one female *Loxa* from British Guiana that agrees very completely with Walker's description of *deducta* and I so identified the species in my list of the Hemiptera of British Guiana. Dr. Distant however identifies *deducta* Walk. with *flavicollis* Drury, a large species with which this could not possibly be confused. I am inclined to think that in this case the type labels in the British Museum have become misplaced.

27. **Nezara pennsylvanica** DeGeer.

Two males and one female of this rare species were taken at Sanford.

28. **Nezara hilaris** Say.

Crescent City, one example.

29. **Nezara viridula** Linneus.

Crescent City, Clearwater and Sevenoaks, not uncommon.

30. **Banasa lenticularis** Uhler.

Two examples of what I believe to be this species were taken at Crescent City. These are light green blotched with darker green and seem not to be fully developed. They have the subspinose connexival angles found in *calva* and *dimidiata* and the sparse punctuation found in *Packardii* and *varians* but the characters of the genitalia are quite distinct from either. They seem to be entirely identical with this West Indian species a typical example of which was kindly given me by Dr. Uhler.

31. **Piezodorus Guildingi** Westwood.

One small male was taken from the bushes near Phillippi's Mound north of Green Springs.

32. **Arvelius albopunctatus** DeGeer.

Crescent City, one example. Mrs. Slosson has taken it at Biscayne Bay.

33. **Dendrocoris fruticicola** Bergroth.

I took this species as far north as Tampa and Sevenoaks but it was much more common southward where I found it at

Ft. Myers and Estero. At the latter place it was abundant with its young on the scrub oaks which grew everywhere where the pine forests had been cut away. It seemed to be a vegetable feeder and in no case did I find it on orange or on any cultivated tree.

34. **Edessa bifida** Say.

My three examples were taken at Crescent City, Clearwater and Ft. Myers.

35. **Stiretrus anchorago** var. **pulchellus** Westwood.

This pretty species was taken on rank vegetation growing along "Lover's Lane" on the Miller estate at Crescent City and later I took one individual at Ft. Myers. Mrs. Slosson has taken the var. *fimbriatus* at Charlotte Harbor and elsewhere in Florida.

36. **Stiretrus anchorago** var. **violaceus** Say.

Sanford. Of the two examples taken one was of a deep violet black color; the other was tinged with steel blue and green.

37. **Podisus maculiventris** Say.

One dark colored example from Sanford and a paler one from St. Petersburg.

38. **Podisus mucronatus** Uhler.

I found but one example of this interesting insect. This was captured on the rank weeds near a garden at Ft. Myers. Mrs. Slosson has found it at Charlotte Harbor and Biscayne Bay.

Family Coreidæ.

39. **Corynocoris distinctus** Dallas.

Crescent City and Estero; two examples.

40. **Archimerus calcarator** Fabricius.

Of this species I took specimens at Crescent City, Tampa, Ft. Myers and Estero; all females. That from Tampa has the pronotum proportionately a little broader posteriorly but it does not seem to differ otherwise.

For many years *Coreus alternatus* Say has been placed as a synonym of this species but they most certainly are distinct. *Calcarator* differs from *alternatus* in the following particulars: It is a little smaller and paler and wants the white marks on the margin of the abdomen; the arrangement of the femoral spines is different; the bucculæ are distinctly shorter and more elevated, the lateral plates of the female genital segment are less rounded behind and the antennæ are more slender, with their basal joint less incrassated. *A. calcarator* was described from Carolina but the only specimens I have seen are from Florida. Say's species was described from the Missouri Territory of that day but my material is from Kansas.

From the late Prof. Snow I have received an example of the closely related *A. indecorus* Walker taken by him in southern Arizona. This species has the maculated connexivum of *alternatus* but it is paler in color; the pronotum is more expanded and is marked with three longitudinal dark vittæ, the scutellum is marked with pale and the outer genital plates of the female are larger and more acute behind than in either of the preceding species.

41. **Spartocera confluenta** Say.

Crescent City and Clearwater. I took this species on garden fences much as *Anasa tristis* is found in the north. For many years this insect has been identified with *Sagotylus triguttatus* H. S. which however is a very distinct insect. This is a true *Spartocera* very near to *fusca* of which Stal places it as a synonym. I believe however that it is sufficiently distinct to be given specific rank.

42. **Euthoctha galeator** Fabricius.

Taken at all stations but much more abundant toward the south.

43. **Acanthocephala femorata** Fabricius.

This large coarse insect was not uncommon at most places where we collected. It was most abundant about 4 p. m. flying about weedy places in the bright sunlight; later in the evening they could be picked off from the weeds and grasses where they were resting.

44. **Leptoglossus phyllopus** Linneus.

Abundant everywhere in Florida.

45. **Leptoglossus Ashmeadi** Heidemann.

Two examples were beaten from trees at Phillippi's Mound at Green Springs. Mr. Heidemann's description of this species follows this paper.

46. **Chariesterus antennator** Fabricius.

Two immature examples were taken at Estero.

47. **Catorhintha guttula** Fabricius.

Crescent City and Sevenoaks, not uncommon.

48. **Althos obscurator** Fabricius.

This species has never been figured or properly described. The present specimens agree in every particular with the short description by Fabricius and Stal. It has already been reported from many localities from Argentina to Mexico and it would require but little extension of its range to include southern Florida, and such a distribution would not be at all remarkable as it seems to be a salt marsh insect and might readily spread along the shores of the subtropical seas. I found it not uncommon on sedges and grasses on the marshy shores of Lake Monroe at Sanford and took it under similar conditions at Crescent City and St. Petersburg, and Prof. Blatchley has sent me specimens taken by him at Ormond. Kirkaldy substituted the above generic name for *Margus* in 1904.

49. **Leptocorisa tipuloides** DeGeer.

Crescent City and Clearwater among rank weeds. A number of immature examples were seen with the adults and a little later the species might have been common.

50. **Alydus pilosulus** H. S.

Common and widely distributed in Florida.

51. **Stachyocnemus apicalis** Dallas.

St. Petersburg and Estero, two examples. These are somewhat smaller than New Jersey specimens in my collection.

52. **Harmostes reflexulus** Say.

Common everywhere in Florida.

53. **Harmostes affinis** Dallas.

At Ft. Myers I collected quite a series of what I took to be *Harmostes serratus* but on comparison with a series of the latter species taken by me in Jamaica I find that these Florida specimens are less strongly dotted, the antennal joints are more nearly equal in length, the rostrum is shorter and the tubercular spines on the antenniferous processes are shorter and are directed forward, and the clypeus is less produced at apex. In *serratus* the acutely produced tylus almost attains the apex of the first antennal joint and the spines at the base of the antennæ are directed distinctly outward as well as forward. These specimens seem to be conspecific with the Texan example determined as *affinis* in my paper on Jamaican Hemiptera (p. 13,) although that specimen is paler in color and has a still shorter rostrum.

54. **Corizus (Liorhyssus) hyalinus** Fabr.

At Estero I took three very small pale colored specimens that I believe belong to this species. They are almost immaculate except for a black area toward the base of the tergum.

55. **Corizus (Arhyssus) lateralis** Say.

One large somewhat immature example of this common and variable species was taken at Sanford. Two other uncertain forms of *Corizus* were taken at Sanford and Crescent City both of which are near *lateralis* and possibly are not distinct.

56. **Corizus (Arhyssus) punctatus** Signoret.

Crescent City; one example. This species is very near to *nigristernum* Sign. as I have formerly determined that species, but it has the dorsal plate of the female genital segment a little longer and more pointed and a ventral plate of nearly the same shape as that found in its ally. The present specimen is a little lighter in color than an example from San Rita Mts., Arizona, kindly given me by Prof. Snow.

57. **Corizus (Niesthrea) sidæ** Fabricius.

This southern species seemed to be rare in Florida. I took examples at Crescent City and St. Petersburg representing both the large pale form generally known as *sidæ* and the smaller darker form described as *pictipes* by Stal. These two forms may yet prove to be distinct but it seems hard to fine characters that will separate them satisfactorily.

The American forms of this difficult genus have never been properly worked out. Signoret's so-called Monograph was merely a collection of descriptions founded largely on color characters, of the species of the world known to him, with no attempt at systematic arrangement and few comparative notes. Stal published some excellent systematic work on the genus but he knew but few of our American forms. During the past summer (1908) two interesting papers on our species have been published. A careful and valuable revision by Mr. J. C. Hambleton appeared in the June number of the Annals of the Entomological Society of America, (vol. 1, pp. 133-147.) This paper leaves our species in good shape for further study but unfortunately Mr. Hambleton does not take any notice of the valuable genera and subgenera established by Stal and now generally adopted by the European entomologists, and there are one or two of his determinations of which I cannot but feel doubtful. He is certainly correct in placing *viridicatus* Uhler as a species distinct from *hyalinus* Fabricius but is in error in allying it with *crassicornis*. It is very close to *hyalinus* but may readily be distinguished by the form of the dorsal genital plate of the female which is short and truncated in *hyalinus* and much longer and rounded at apex in *viridicatus*. The July number of the Canadian Entomologist, mailed about two weeks after the appearance of Mr. Hambleton's paper, contains some systematic notes on this genus by Prof. Carl F. Baker in which he has located our species in their generic or subgeneric positions. This paper would supplement the revision by Mr. Hambleton very well were it not that their determinations do not always agree. Through some singular oversight Mr. Baker states that Stal has in the Enumeratio restricted the old genus *Corizus* to *crassicornis* and its allies. Stal does not mention *crassicornis* in the Enumeratio but in this "Genera Coreidarum Europæ disposuit" he establishes genus *Stictopleurus* for this very species and restricts *Corizus* to those species in which the corium is entirely coriaceous, no representative of which is known to me from America. Mr. Baker indicates but does not describe four forms of *novæboracensis* Sign. (*crassicornis* Fabr.), the name of one of which, *pallidus*, conflicts with *Corizus pallidus* J. Sahlbg. from Siberia. I am rather inclined to agree with Mr. Baker in his determination of *nigristernum* and *Bohemani* He places the former name on the dark form of *lateralis* and the latter on the species usually determined in this country as *nigristernum*. I doubt very much if the identity of some of the species of Signoret and Dallas can finally be determined without reference to the types.

58. **Jadera hæmatoloma** H. S.

Sanford; one example.

Family Metacanthidæ.

59. **Jalysus spinosus** Say.

This species was not at all abundant. I took it at Crescent City and Clearwater only. About Buffalo it is very rare but from New Jersey to Colorado it is the predominant form.

60. **Jalysus perclavatus** n. sp.

Allied to *spinosus* and *Wickhami* but much smaller and with a thicker and shorter antennal knob. Color pale testaceous yellow as in the allied species. Disk of the pronotum and clavate apex of the femora a little darker; apical joint of the antennæ, tarsi and apex of the rostrum black, the former polished and clothed with scattering minute hairs; abdomen more testaceous, sometimes tinged with greenish and darkened to olive on the venter. Head about as long as the posterior lobe of the pronotum; vertex elevated anteriorly and produced in a rather long, almost erect blunt spine between the bases of the antennæ. Antennæ: first joint but little shorter than the two preceding together, clavate at apex; second nearly as long as the third; fourth unusually short and thick, fusiform, a little shorter than the head and almost half as thick. Rostrum attaining the intermediate coxæ, first joint just reaching the base of the head. Scutellar and metapleural spines unusually long. Hind femora surpassing the abdomen by the length of its clavate apex in the male, but very little exceeding the abdominal tip in the female. Elytra almost hyaline, the tip of the slender apex of the corium concolorous. Length; male 5mm.; female, 6mm.

Described from eleven examples taken at Crescent City, Sanford, Tampa and St. Petersburg. This species is very distinct by its small size, the short thick terminal joint of the antennæ, the erect spine between the bases of the antennæ, and the concolorous tips of the corium.

61. **Metacanthus decorus** Uhler.

This pretty little West Indian form I took at Estero only It pertains to the subtropical fauna which extends up the west coast of Florida as far at least as Estero and Sanibel Islands.

Family Lygæidæ.

62. **Oncopeltus fasciatus** Dallas.

Sanford and Sevenoaks. Swept from rank vegetation about the "palmetto hummocks". I found but two examples of this widely distributed species.

63. **Lygæus lineola** Dallas.

This insect seemed to be a general inhabitant of the state and was abundant especially toward the south. I took it at Crescent City, Sanford, St. Petersburg, Clearwater, Ft. Myers and Estero. At the latter place it was common on the dry grasses in the open pine barrens.

64. **Lygæus mimulus** Stal.

This species was common on the prairies at Haw Creek near Crescent City and I took single examples at St. Petersburg and Estero. Superficially it closely resembles *lineola* but may be distinguished by the rufous immaculate anterior lobe of the pronotum, and the pale orbits of the eyes and knees. The pale margin of the membrane also is nearly obsolete.

65. **Lygæus facetus** Say.

Tampa. A single specimen swept from the dry fields east of the city. The inner sutures of the elytra are slenderly pale in this individual and the hind margin is concolorous.

66. **Lygæus albulus** Distant.

At Crescent City I took two examples of what I believe may be a dark form of this species, The typical *albulus* as I identify it, I have taken at Denver and Ft. Collins, Colorado, and have received others from Prof. Wickham that were taken at Marysville, Utah. The western specimens have the elytra dark rufous brown with their margins paler. The present examples from Florida have the elytra almost black with most of the costa and the scutellar margins rufous. In all the basal angle of the membrane is deep black followed by a conspicuous white mark, and a smaller one adjoins the tip of the corium. Dr. Uhler's description of *Lygæosoma solida* agrees very closely with this species.

67. **Nysius californicus** Stal.

Abundant everywhere I collected in Florida.

68. **Belonochilus koreshanus** n. sp.

Smaller and darker than *numenius*. Head more slender anteriorly, the tylus being a little more produced and exceeding the cheeks by at least its own width; ocelli placed distinctly nearer together than in the allied species; scarcely more distant from one another than from the eye. Bucculæ distinctly elevated as far as the base of the antennæ where they become evanescent. Second joint of the antennæ hardly longer than the third, slightly clavate at tip. Scutellum a little longer than in *numenius*. Hind margin of the corium almost straight, scarcely angled at the discal nervure. Anterior femora unarmed. Rostrum normally reaching nearly to the apex of the sixth ventral segment; sometimes shorter, in one specimen not surpassing the fourth segment. Color clear cinerous or slightly tinged with fulvous; head, pronotum, scutelum and pectus coarsely and deeply punctured with brown or fuscous. Antennæ rufous, first joint and extreme tip of the second and third grey, an annulus on the first joint, the clavate apex of the second joint and the apical joint dark brown or blackish, the latter paler at tip; a cloud about the ocelli extended as a smooth line interior to the eye, transverse incised line on the pronotum, narrow smooth basal margins of the scutellum, mesosternum, median line and apex of the rostrum, about two lines of obscure linear marks on each side of the pectus and the tips of the tarsi black; a line on either side of the tylus at base, an oblique mark near the inner angle of the eye, two vittæ before the antennæ, the inferior obscurely extended along either side of the rostral canal, a few marks on the elytral nervures, a broken vitta along the middle of the membrane, the disk of the venter and sometimes a few marginal or submarginal points, fuscous or blackish. Membrane whitish hyaline. Tergum black with the middle line and connexivum broadly castaneous, the margins of the latter pale interrupted with black; margin of the coxal cavities and the thickened osteolar orificies whitish as are also the carinate median line of the pronotum and scutellum and the bucculæ. Legs pale, the femora dotted with fuscous, the base and apex of the tibiæ sometimes darker. Wings hyaline, highly iridescent. Whole surface of the body clothed with a minute grey pubescence. Length 5mm.

Described from numerous examples taken at Ft. Myers and Estero. At the latter place I found them abundant on a low branching hirsute labiate plant locally called "pennyroyal". The flowers of this plant form compact heads something like those of the crimson clover, and among the bracts of these this insect could be found by the hundred in all stages of growth. I found them in greatest abundance on the grounds of the Koreshan Unity, whose guest it was my good fortune to be while I was collecting at Estero and to whom I take pleasure in dedicating this interesting addition to our fauna.

I have tried in vain to identify this insect with *Lygæus scolopax* of Say which however seems to be a quite distinct insect that may not pertain to this genus at all.

Belonochilus numenius Say is a much larger and paler species with a black spine on the anterior femora. The length of the rostrum seems to be variable here as in *koreshanus*. It is rare about Buffalo but some years ago Mr. Otto Heidemann helped me to secure a good series from a sycamore tree at Washington, D. C.

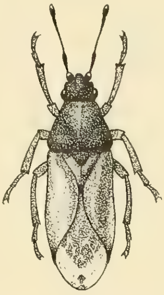
69. **Ninus notabilis** Distant.

I found this insect very abundant everywhere I collected in Florida in sweeping grass and low weeds in damp places and about cultivated fields. The prominent eyes, dark castaneous color, pale almost greenish abdomen, and hyaline elytra with a strong sinuation at the base of the costa, will readily distinguish this tiny species. Mrs. Slosson has sent me specimens from Belleair and I took one in Jamaica.

70. **Cymus breviceps** Stal.

I found this insect abundant on the marshy borders of Lake Monroe at Sanford and took representatives at Crescent City, St. Petersburg and Tampa and Mrs. Slosson has found it at Biscayne Bay. It has much the aspect of *luridus* but is smaller being about the size of *angustatus* from which it may be distinguished by its pale color and the longer basal joint of the antennæ.

71. **Cymus bellus** n. sp.



CYMUS BELLUS

Form of *angustatus* but much smaller and marked with black and white on a testaceous ground. Head short and broad, much swollen across the base, strongly punctured; tylus much deflected, viewed from above short and broad, but little longer than the short pointed cheeks. Eyes not prominent. Basal joint of the antennæ thick, cylindrical, as broad as the tylus which it exceeds by one half its length; second about one third the length of the first; third considerably longer than the second and like it slender and and feebly clavate at apex; fourth about equal to the first, fusiform. Bucculæ prominent, rounded, thick and punctured like the cheeks and tylus with which they are confused. Rostrum attaining the intermediate coxæ; first joint not quite reaching the base of the head. Pronotum strongly convex posteriorly; lateral margins sinuated just before the humeri, almost rectilinear anterior to this sinus; median carina distinct for a short space before the middle; anterior edge elevated and thin; surface coarsely and regularly punctured. Scutellum short carinate posteriorly. Elytra coriaceous, punctured; apical margin rather strongly sinuated near its apex. Length 3mm.

General color castaneous. Head deep black; antennæ testaceous, darker or castaneous on the apical joint; first joint deep black as far as the tip of the tylus, its apex white. Pronotum shading to black posteriorly, at least in the males; anterior edge whitish. Scutellum dark castaneous becoming black at apex, sometimes white on either side. Elytra testaceous becoming a little darker inwardly and along the base of the costa; extreme tip of the clavus and slender hind margin of the corium black; membrane whitish hyaline with a narrow median fuscous vitta. Beneath castaneous; the legs a little paler, claws black.

Sevenoaks. Described from numerous examples swept from a fine grass or more probably a Juncus growing on one of the dry open depressions that are common in the interminable pine barrens of Florida. This is a tiny but very pretty species with much the aspect of certain of the Tingids. I have received from Mr. W. J. Gerhard a much paler specimen taken at St. Augustine, Fla. In this individual the intense black of the head and basal joint of the antennæ persists and well distinguishes the species.

72. **Ischnodemus rufipes** n. sp.

Aspect of *falicus* but a little larger. Black, opake, clothed with a minute cinerous pubescence; hind margin of the pronotum more or less castaneous; antennæ slightly tinged with castaneous basally; tergum and borders of the venter shading to castaneous, the edge of the connexivum pallid; legs pale rufous, immaculate or nearly so. Antennæ stout, sparcely clothed with hairs, basal joint short, but little surpassing the head; second and fourth equal, the latter fusiform and pallid at tip in some examples; third distinctly shorter and like the second slightly thickened at tip. Rostrum pale rufous, almost exactly reaching the base of the prosternum; second joint extending for nearly half its length beyond the base of the head. Elytra in macropterous examples lurid white; clavus with the scutellar margins slenderly and faintly infuscated; commissural margins broadly infuscated; corium tinged with fulvous along the costa; inner nervure and apical at base heavily blackish; costal area becoming coriaceous and castaneous or blackish at apex, this castaneous color extending up the apical margin to meet the marking on the inner nervure; large discal area of the corium immaculate; membrane marked with a brown cloud near the apex of the corium and a fainter cloud on either side at the middle of the margin; nervures except the median more or less infuscated. Elytra of the brachypterous form reaching to the second tergal segment; testaceous or brownish with a narrow white membrane. Length of macropterous form 5 mm.

Described from four macropterous and four brachypterous examples captured at Crescent City, Clearwater and Estero, and one pair taken by Mrs. Slosson at Lake Worth. This species is near *falicus* but it is a little larger, the disk of the corium and clavus are immaculate, not veined with fuscous as in *falicus;* the veins of the membrane are less heavily infuscated and the rostrum is longer. It is still nearer *præcultus* Distant but the color of the antennæ and the markings of the elytra sufficiently distinguish it. In *falicus* the terminal three joints of the antennæ are subequal, the second joint of the rostrum does not nearly attain the base of the head, and the whole rostrum is castaneous or black. In *rufipes* the oblique hind margins of the fifth ventral segment of the female meet on the median line close to the base of the segment while in *falicus* they terminate under the margin of the fourth segment some distance either side of the median line.

73. **Ischnodemus badius** n. sp.

Allied to *Sallei.* Brachypterous form: Long and narrow; castaneous or at times almost black, darker beneath. Superior surface of the head and pronotum and the legs paler of even testaceous. Connexivum testaceous. Scutellum and sometimes a submarginal vitta on the tergum bordering the connexivum and including a row of black points, fuscous. In a few examples the head and anterior margin of the pronotum are also black. Tylus broader than in *falicus*. Antennæ shading to black at apex; first joint stout, exceeding the tylus by one third of its length; remaining joints of about equal thickness, more slender at apex; second and fourth subequal; third distinctly shorter. Rostrum attaining the intermediate coxæ; second joint surpassing the base of the head by one half its length. Pronotum smooth, oblong; sides straight behind, rounding anteriorly slightly constricted by a broad punctured band behind the middle; anterior lobe with a deep longitudinal furrow ending before in a feebly punctured submarginal line. Elytra very short and narrow, reaching to the base of the second dorsal segment of the abdomen; testaceous brown with an angled fuscous shade bordering the claval suture and apical margin; membrane narrow, whitish. Length 5-7 mm.

Described from fifteen examples which were swept from marsh grass along the shore of Tampa Bay at St. Petersburg. This species may be distinguished by its castaneous color and the oblong smooth pronotum with a conspicuous longitudinal discal furrow.

74. **Ischnodemus lobatus** n. sp.

Closely allied to the preceding. Black, covered with a minute grey pubescence; base of the antennæ, rostrum and legs rufous; lobate posterior angles of the pronotum and the elytra testaceous, the latter obscurely veined and clouded with blackish posteriorly. Membrane short, reaching the middle of the second segment of the tergum; white with two or three fuscous veins. Pronotum rather short, hind edge deeply arcuated; sides parallel posteriorly then abruptly approaching to the narrow apex; median longitudinal furrow nearly obsolete; disk anteriorly with a large smooth intensely black mark on either side. Antennæ stout, basal joint short-oval, but little thicker than the remaining joints; second and fourth subequal; third a little shorter. Rostrum almost attaining the intermediate coxæ; second joint surpassing the base of the head by more than half its length. Length 6 mm.

Described from one brachypterous female taken at Estero.

75. **Blissus leucopterus** Say.

One small macropterous example of the common chinch bug was taken at Ft. Myers and a larger brachypterous one at Sanford. I was constantly on the lookout for this insect but saw only these two.

76. **Geocoris bullatus** Say.

Of this species I took one female at Crescent City, a male at Tampa and another at Estero. It evidently was rare in Florida but farther north replaces *punctipes*.

77. **Geocoris punctipes** Say.

Abundant everywhere I collected in Florida. It strongly resembles *bullatus* but may readily be distinguished by the head which in *punctipes* is flattish, smooth and polished, and marked by a longitudinal line crossed at about the middle by a sinuated transverse one. In *bullatus* the head is convex, finely punctured or shagreened and without incised lines on the disk. There are also differences in color and markings and in *bullatus* there are two conspicuous smooth pale spots in the callosities of the pronotum which in *punctipes* are but vaguely indicated. Prof. Montondon has kindly studied my material in this genus and these determinations are made by comparison with this material.

78. **Geocoris uliginosus** Say.

I took this species at Crescent City, Sanford and Ft. Myers but did not find it at all common. The males have pale legs and antennæ. Mrs. Slosson has taken at Belleair the variety of this species named *speculator* by Montondon.

79. **Oedancala dorsilinea** A. & S.

I found this species abundant everywhere I collected in Florida. There can, I think, be little if any question as to the correct determination of this species and of our more northern *dorsalis* Fitch, although Amyot and Serville make their figure proportionately too broad for the southern form to which their description almost perfectly applies. I have however been unable to satisfy myself as to the identity of *crassimana* Fabricius which he describes as having the anterior femora unarmed. If his description applies to either of our species I believe it must be *dorsalis* as indicated by Stal. This southern species may be distinguished from our northern *dorsalis* by its having the first joint of the antennæ nearly or quite as long as the two succeeding together while in *dorsalis* it is nearly one third shorter. In *dorsilinea*, too, the calloused vittæ of the scutellum are generally shorter; the ground color is paler, especially beneath; the anterior femora are not black beneath; there is a brown point on the hind margin of each elytron and the form of the whole insect is decidedly longer and narrower.

80. **Paromius longulus** Dallas.

Taken at Crescent City, St. Petersburg, Ft. Myers and Estero. It seemed to be common.

81. **Ligyrocoris abdominalis** Guerin.

A single dark specimen was taken from the borders of a garden at Ft. Myers. Mrs. Slosson has taken it at Lake Worth.

82. **Ligyrocoris multispinus** Stal?

One small dark example was taken at Sanford. This has the head and prononotum entirely black except for a few obscure vittæ on the posterior lobe of the latter, and it is but six millimetres in length. Otherwise it agrees well with Stal's description and Distant's figure.

I searched diligently for a specimen of *L. litigiosus* Stal which has been taken at Biscayne Bay by Mrs. Slosson but was unable to find one.

83. **Myodocha serripes** Olivier.

One small larva was taken at St. Petersburg.

84. **Heræus plebejus** Stal.

One example taken by sweeping at Sanford.

85. **Pamera vincta** Say.

Common everywhere I collected in Florida. This is the *parvula* of Dallas.

86. **Pamera bilobata** Say.

Another common species found everywhere in the state.

87. **Pamera bilobata** var. **scutellata** Dallas.

At Crescent City I took one example of what for the want of a better determination I am compelled to identify with the above species of Dallas. A series would, I believe, show this to be a good species and perhaps not *scutellata* at all. It has the head more porrect and the base of the fourth antennal joint pale; the ground color is also paler and the anterior femora are much more swollen.

88. **Pamera basalis** Dallas.

Crescent City; one example.

89. **Ptochiomera nodosa** Say.

Crescent City; one macropterous example.

90. **Ptochiomera antennata** n. sp.

Form of *clavigera* but with more slender antennæ. Castaneous or fusco-castaneous, very minutely sericeous pubescent on the head, anterior lobe of the pronotum and lower surface; posterior lobe of the pronotum, scutellum and elytra testaceous or somewhat tinged with castaneous, and coarsely punctured with fuscous; the punctures on the elytra forming well marked rows along the principal nervures; five longitudinal vittæ on the posterior lobe of the pronotum, the median line of the scutellum, a longitudinal line and two costal spots beyond the middle of the corium, fuscous or blackish; extreme humeral angles, tip of the scutellum, two marks on the apical margin of the corium and the costa pale or whitish. Membrane slightly infuscated, the nervures paler. Beneath quite uniformly castaneous, a little darkened on the venter, with paler marks about the insertion of the legs and on the stigmata; the latero-posterior angles or "flaps" of the propleura and metapleura whitish, the former with a fuscous discal mark. Rostrum and legs pale, the femora, especially the anterior, infuscated. Antennæ rather short and stout; basal joint cylindrical, as thick as the third, surpassing the tylus by one half its length; remaining joints regularly increasing in thickness from the slender base of the second; the apical fusiform, paler beyond its middle, about the length of the second; third shortest. Length scant 3mm.

Described from one female specimen that I took running on a hot sand bank by the trolley tracks at Tampa, May 2d. Prof. F. H. Snow has sent me for study another female which differs only in being more ferruginous in color. It was taken by him on the Santa Rita Mts. in Arizona at an altitude of 5,000 to 8,000 feet. This species is nearest to *clavigera* Uhler but the length of the antennal joints are different and the apical two are much less thickened. The posterior lobe of the pronotum is also shorter and the elytral markings are different.

Family Largidæ.

91. **Largus succinctus** Linneus.

Sanford, Sevenoaks and Estero. These specimens vary much in color but all are rather light. The western specimens in my collection are from California and are almost black with the rufous border of the pronotum, elytra and abdomen very conspicuous.

For some reason I was unable to find a single specimen of *Dysdercus* in Florida where Mrs. Slosson has taken at least three species.

Family Tingidæ.

92. **Corythuca marmorata** Uhler.

Ft. Myers; one example only. This is intermediate in size between our large northern specimens and the small ones taken by me at Montego Bay, Jamaica, and I feel confident that they represent but a single species.

93. **Corythuca floridana** Heidemann.

Of this little species I took numerous examples from the bushes growing along the southern shore of Lake Stella at Crescent City. It is somewhat allied to *gossypi* Fabr. and *marmorata* Uhler but sufficiently distinct from either. It has much the shape of *unifasciata* Champ. as figured in the Biologia but it is smaller and less spinose and the cresting is different. Mr. Heidemann's description follows this paper.

94. **Teleonemia Belfragii** Stal.

Closely related to *notata* Champion but smaller with more slender antennæ and paler colors. Whitish testaceous or more or less tinged with ferruginous; head, pronotum anteriorly and the abdomen more distinctly ferruginous; head and lower surface covered with a mealy pubescence. Anterior spines of the head a little longer than in *sacchari*, the median suberect. Antennæ more slender than in any other species known to me, clothed with a very minute pubescence; pale whitish testaceous; tip of the first and second and whole of the apical joint fuscous brown; bucculæ and lateral dorsal spine whitish. Pronotum tinged with ferruginous anteriorly; the strong carinæ and the apex and anterior margin broadly whitish, the latter quite deeply bisinuate, the middle and anterior angles being well produced and subacute; the triangular posterior portion obtuse, scarcely if at all areolate. Elytra mostly fuscous with the base and two marginal spots on the discoidal area and a large cloud on the base of the membrane subhyaline and including a fuscous apical spot. Costal membrane rather wide for this genus, the transverse nervures strong, brown, about four or five of them black, these areoles longer than wide. Wings fuscous, at least at apex. Legs pale or whitish; the knees and tips of the tibiæ brown; tarsi black. Length 3½ mm.

Three examples were taken at Crescent City and Sanford. I have redescribed this species as Stal's description is altogether insufficient and even with the aid of Champion's figure in the Biologia I could not finally satisfy myself as to its identity. Mr. Heidemann has however very kindly compared my specimens with undoubted examples of *Belfragii* in the National Museum and pronounces them identical. Mrs. Slosson reports this species from Biscayne Bay where she has taken so many rare and interesting Hemiptera.

95. **Atheas exiguus** Heidemann.

I took a good series of this insect at Sevenoaks from a low plant with small leaves having much the aspect of wild indigo. It is described by Mr. Heidemann in a paper in this number of the Bulletin.

Family Phymatidæ.

96. **Phymata erosa Guerini** L. & S.

This West Indian variety of *erosa* has thus far been recorded from Cuba only. I took it in abundance at Ft. Myers and Estero and found it in less numbers as far north as Crescent City. Mr. Gustav Beyer of New York has kindly sent me specimens of this same variety taken by him at Key Largo, Fla. It may be distinguished from *fasciata* by the strongly expanded pronotal margin having the humeral portion behind the deep median notch acutely bidentate. The abdomen is also more broadly and acutely expanded at the fourth segment.

97. **Phymata vicina** Handlirsch.

At Sanford I took a single example that I feel quite certain belongs to this species and from Prof. John Barlow I have received another taken by him at Kingston, R. I. Mr. Heidemann has examined my Florida specimen and agrees with me in this determination. These specimens agree in every respect with the description given by Handlirsch except in color. Both are males and are black varied with pale yellow or whitish on the abdomen posteriorly and basally at either side, and there are two white marginal spots on either side of the pronotum anteriorly. The apical two joints of the antennæ and the knees, tibiæ and tarsi of the intermediate and posterior feet are also pale and the elytra are testaceous brown. The apical bifurcations of the head are directed outward and forward, not forward only as shown in Handlirsch's figure. This variation from the type in color is no more than we find in several other species in this genus. The discovery of this species in Rhode Island extends its range far to the north.

98. **Macrocephalus cimicoides** Swederus.

Tampa; one example. This species is very close to *notatus* from Central America but the second and third joints of the antennæ are shorter and broader and I follow Handlirsch in considering them distinct.

99. **Macrocephalus prehensilis** Fabricius.

Sanford and St. Petersburg. This is a much smaller species than the preceding with the scutellar keel but slightly thickened at base. It seems to be widely distributed through the warmer portions of the United States.

Family Aradidæ.

100. **Aradus gracilicornis** Stal.

I took a single example of this species at Crescent City and Mrs. Slosson has several taken in Florida. It is very near *lugubris* but is a more slender insect and has a very different male genital segment.

101. **Aradus Falleni** Stal.

Described from Brazil and heretofore reported from so far north as Washington, D. C. I took it at Crescent City, Sanford, St. Petersburg and Clearwater. With the exception of *cinnamomeus* this is the smallest *Aradus* known to me. It may be distinguished from the other members of the *lugubris* group by its thicker and shorter antennæ the second joint of which is distinctly shorter than the apical two together.

102. **Mezira granulata** Say.

Taken in numbers from under the loose bark, or more correctly leaf scales, of a rotten palmetto palm on the prairies at Haw Creek near Crescent City. This generic name now replaces *Brachyrhynchus* which is preöccupied. These were the only Aradids taken by me but Mrs. Slosson has reported a number more including the rare southern *Calisius pallipes* Stal.

Family Reduviidæ.

103. **Ploiariodes errabunda** Say.

Taken at Crescent City, Sanford, Tampa and Ft. Myers.

104. **Emesa longipes** DeGeer.

Crescent City; nymphs and adults taken together.

105. **Stenopoda culiciformis** Fabricius.

Ft. Myers; one nymph.

106. **Conorhinus sanguisugus** Le Conte.

Estero. Sometimes troublesome about houses.

107. **Sirthenea carinata** Fabricius.

Clearwater; one example taken at electric light. This specimen bit viciously when captured producing a wound as painful as that inflicted by the Notonectas.

108. **Ectrichodia cruciata** Say.

Crescent City; one example.

109. **Apiomerus crassipes** Fabricius.

Crescent City, St. Petersburg, Clearwater, Tampa and Estero. Not uncommon and exhibiting no great variation.

110. **Zelus bilobus** Say.

Crescent City, Sanford and Estero. In this species the legs and antennæ are entirely black; in *longipes* the legs are annulated while in *rubidus* the legs and antennæ all are annulated. In *bilobus* and *rubidus* the venter is rufous but in *longipes* it is banded with black. These forms are very close and might perhaps be arranged as varieties of one species as was done by Stal in his Hemiptera Mexicana.

111. **Zelus cervicalis** Stal.

Abundant everywhere I collected in Florida.

112. **Pindus socius** Uhler.

Crescent City; one example. This individual differs from western material in my collection in having the pronotum narrower and the feet immaculate.

113. **Pselliopus cinctus** Fabricius.

Crescent City; one example only.

114. **Repipta taurus** Fabricius.

Crescent City, Sanford and Clearwater. Not uncommon.

115. **Atrachelus cinereus** Fabricius.

Not uncommon at most places where I collected.

116. **Arilus cristatus** Linneus.

The young of this species were taken occasionally at Crescent City and elsewhere.

117. **Sinea spinipes** Herrick-Schæffer.

I took this species as far south only as St. Petersburg. In my collection are examples from Key Largo, Fla., Atlanta, Ga. and Kansas.

118. **Sinea Rileyi** Montondon.

Taken at nearly all stations where I collected in Florida. At Estero it was abundant but was more rarely met with toward the northern parts of the state. It can be separated from the preceding species by the shorter spines on the anterior lobe of the vertex and the concolorous antennæ.

Family Capsidæ.

119. **Monolocoris filicis** Linneus.

Sanford. Not uncommon on ferns. Paler than is usual in *filicis* with the tip of the second antennal joint black.

120. **Pycnoderes insignis** Reuter.

Crescent City, Sanford, Sevenoaks and Ft. Myers. This is a smooth deep black species with the antennæ, legs and apex of the membrane white. I have taken this form at Gowanda, N. Y.

121. **Pycnoderes** sp.

Very closely allied to the following but the antennæ and legs are pale with the apical half of the hind femora black. I took one example at Sanford on April 26th.

122. **Sixeonotus tenebrosus** Distant.

Near *P. insignis* but smaller with the basal two joints of the antennæ and the legs except the tarsi black. The hind edge of the pronotum is straight, not at all emarginate as in the allied species. I took one example at Clearwater.

123. **Cyrtocapsus caligineus** Stal.

Crescent City; four examples. A subtropical form which I took in Jamaica.

124. **Pœcilocapsus nigriger** Stal.

Not uncommon at all localities. This species has the head and anterior portion of the pronotum bright fulvous and the cuneus has a large central black spot. Otherwise it differs little from our northern *lineatus* Fabr.

Dr. Distant has very kindly compared this form with the Mexican material figured in the Biologia and reports that they agree in all essential particulars.

125. **Pœciloscytus basalis** Reuter.

Abundant everywhere I collected in Florida, and as elsewhere showing much variation in the extent and intensity of its markings.

126. **Polymerus americanus** Reuter, variety.

Sanford; two examples. Entirely black and not at all pubescent; slender costal margins, nervures of the membrane and apical two joints of the antennæ whitish; legs pale, the femora orange. Otherwise like the northern specimens of this species.

127. **Lygus tenellus** Uhler, MS.

Sevenoaks and Crescent City. These specimens agree in every respect with northern material. No description of this species has ever been published.

128. **Lygus apicalis** var. **prasinus** Reuter.

Taken at Sanford, Tampa, Sevenoaks, and at Ft. Myers where it seemed to be abundant. A subtropical species that I did not take in the northern part of the state.

129. **Lygus olivaceus** Reuter.

Abundant everywhere in Florida. Dr. Reuter described this species from material taken by me in Jamaica.

130. **Lygus** sp.

A small but very neat little species near the preceding, which I took only at Sevenoaks.

131. **Lygus?** sp.

One example of a small pale green species which may be immature was taken at Sevenoaks.

132. **Eustictus grossus** Uhler.

One example was beaten from trees in a grove at Crescent City. This genus which includes also *Megacœlum catulum* Uhler and *M. pusillum* Uhler has only recently been founded by Dr. Reuter.

133. **Eustictus mundus** Uhler.

One damaged specimen of this species was beaten from bushes at the northern end of Lake Stella at Crescent City. In this species the scutellum is piceous and the fuscous band at the apex of the elytra covers most of the cuneus excepting its outer margin. The membrane is quite strongly infuscated with the nervures darker. It is very closely allied to the western *pusillus* Uhler.

134. **Creontiades rubrinervis** Stal.

Not uncommon at all localities. Dr. Distant now merges genus *Creontiades* with *Megacœlum.*

135. **Creontiades** sp.

Swept from low oak bushes at Estero. This is a smaller species than *rubrinervis;* pale yellowish in color with the tibiæ and slender margins of the elytra clear bright green and the head and a basal cloud on the pronotum reddish fulvous.

136. **Neurocolpus nubilus** Say.

One example with the corium almost uniformly dark rufous was taken at Sevenoaks.

137. **Phytocoris eximius** Reuter.

Crescent City and Sevenoaks. The six examples taken show the usual variation in depth of color.

138. **Phytocoris** sp.

Estero; one example. Allied to the preceding and *puella.*

139. **Phytocoris** sp.

Sevenoaks. A small dark rufous species a series of which was swept from coarse grasses in a swampy opening in the pine forests.

140. **Phytocoris antennalis** Reuter.

Common on the dry sparse grasses in the pine barrens everywhere south of Sanford. This is a black insect with white points on the elytra and has much the aspect of certain species of *Fulvius.*

141. **Resthenia insitiva** Say.

Crescent City; three examples.

142. **Resthenia** sp.

Three examples of what I take to be variations of a single species near *thoracica* Distant were taken at different localities. One from Crescent City is sanguineous with the eyes, antennæ, legs and elytra black. Another from St. Petersburg differs in having the disk of the pronotum also black. The third is like the last variety except that the costal margin is sanguineous. It is from Clearwater. These all differ from *insitiva* in having the rostrum longer, attaining the posterior coxæ.

143. **Resthenia** sp.

This was a common species at all localities. It has the body sanguineous with the disk of the head, antennæ, legs, apex of the abdomen, scutellum and elytra, its costal margin excepted, black. It has a rostrum reaching to the intermediate coxæ. Sometimes the sanguineous portions are lighter or even yellowish.

144. **Resthenia insignis** Say.

Common and widely distributed in Florida.

145. **Trigonotylus pulcher** Reuter.

Taken frequently at Crescent City, Sanford, St. Petersburg and Ft. Myers.

146. **Collaria oculata** Reuter.

Crescent City and Sevenoaks; two examples.

147. **Lomatopleura** sp.

Crescent City and Sanford. I have taken this species at Phoenicia and Lancaster, N. Y.

148. **Haltica Uhleri** Girard.

Of this common and widely distributed species I took a male at Crescent City and a female at Sanford.

149. **Garganus fusiformis** Say.

Crescent City. Not common.

150. **Coquillettia mimetica** Osborn.

Two males and three females from Crescent City. This interesting insect is allied to *insignis* Uhler but it is smaller, the colors are darker, the ground color of the elytra being fulvous where it is olive in *insignis.* The shape of the head is also quite distinctive; in *mimetica* this is narrowed behind the eyes in a neck which is almost as long as the width of the eye. The females look very much like a large black ant but the long legs and different movements will quickly reveal their identity to the practised collector. Mrs. Slosson has taken this at Jacksonville.

151. **Ceratocapsus pumilus** Uhler.

Crescent City and Sanford. This is a smaller and paler form which Mr. Heideman believes is not specifically distinct from *pumilus*.

152. **Ceratocapsus** sp. nov.?

This is a very pretty species of a pale greenish color with red head and antennæ which seems to be still undescribed. I beat it occasionally from low bushes of a broad leaved oak at Estero, and found one at Sevenoaks.

153. **Pumillia** sp.

So determined by Mr. Heidemann. It is a black little species resembling the West Indian *Ceratocapsus nigropiceus* Reuter. I took it at Crescent City and Sevenoaks.

154. **Dicyphus separatus** Uhler.

Ft. Myers; one example. This is smaller than our northern specimens of this species but Mr. Heidemann thinks it conspecific.

155. **Cyrtopeltis tenuis** Reuter?

Ft. Myers; two examples. Mr. Heidemann has very kindly compared these with the Reuter co-types and reports that they are very close if not identical.

156. **Macrotylus** sp.

A single example of a tiny little species that is very close to the northern *amœmus* Reuter was taken at Estero.

157. **Reuteroscopus ornatus** Reuter.

One small but clearly marked and typical specimen was taken at Sanford.

158. **Reuteroscopus uvidus** Distant.

Crescent City; one example. I have taken this species in New York, New Jersey and Colorado. Dr. Uhler places it as a synonym of the preceding and Distant's var. "a" seems to be that species.

159. **Atomoscelis seriatus** Reuter.

Sevenoaks and Tampa. Determined by Mr. Heidemann. This species has much the aspect of *Psallus atomophorus* Reuter from Jamaica.

160. **Psallus sulphureus** Reuter.

Taken in numbers from a low clammy weed which was growing on open depressions in the pine barrens at Sevenoaks. Scattering examples were also taken at Tampa and Estero. This is a subtropical form described from material taken by me in Jamaica.

161. **Psallus** sp.

St. Petersburg; one example. This species is near *juniperi* Heid.

162. **Psallus** sp.

A small species with much the aspect of *Rhinacloa forticornis* Reuter was taken at Crescent City, Sevenoaks, Ft. Myers and Estero.

163. **Psallus** sp.

This species is a little larger and more strongly colored than the preceding. One example was taken at Estero.

164. **Sthenarus** sp.

Crescent City and Sevenoaks. A small black species near *plebejus* Reuter from Jamaica.

165. Another Capsid probably representing a new genus and species was taken in two examples at Crescent City.

Family Gelastocoridæ.

166. **Gelastocoris** sp. nov.?

Not uncommon along the shore of Lake Stella at Crescent City and single examples were taken at St. Petersburg and Ft. Myers. This and the following two were kindly determined for me by Mr. Bueno.

Family Nepidæ.

167. **Benacus griseus** Say.

Abundant about the electric lights at Clearwater.

168. **Amorgius Uhleri** Montondon.

With the preceding and equally abundant.

Suborder Homoptera.

Family Cicadidæ.

169. **Cicada viridifascia** Walker.

A pretty little species closely resembling the *canicularis* group from the northern states. I took several males from a tall bunch grass growing along the shore at the southern end of Estero Island. The day was cool and rainy and these insects were not at all active and were easily traced by their short, hoarse note. They vary considerable in the extent of the black markings above but the broad green band on the hind margin of the pronotum is characteristic. Dr. Distant places *Cicada sordidata* Uhler as a synonym of this species although the hind margin of the pronotum is described as piceous in that species.

170. **Cicada hieroglyphica** Say.

Apparently common throughout the southern portion of Florida. I was unable to capture any in the pine woods if indeed they live there but in the clearings along the Estero River they were abundant on the low oak bushes. They were not particularly shy and I was able to approach sometimes very close to them before they would stop their shrill and long continued notes. As in the case of the preceding species I took only males. I did not feel that I could spare the time to hunt for the silent females among the dense foliage of the oak bushes.

171. **Melampsalta parvula** Say.

One tiny male was beaten from a small tree of a broad-leaved oak at Tampa. This specimen made a surprisingly loud noise for so small an insect. It is pale green, almost immaculate, and measures scarcely 12mm. to the tip of the closed elytra.

Family Fulgoridæ.

Subfamily Fulgorinæ.

172. **Cyrpoptus Belfragei** Stal

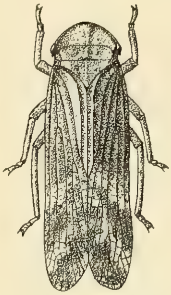
I have one large female from Tampa which I believe belongs to this species. It is almost certainly specifically identical with a smaller and paler male from Virginia sent to me by Mr. Heidemann under this name and in all essential particulars answers to Stal's description. In this female the elytra are largely opake and fuscous with a small pale spot on the clavus near the middle of its sutural margin and a similar mark along the base of the inner ulnar nervure; the apical portion of the costal area is paler and subhyaline interrupted by an oblique fuscous cloud near the apex thus indicating the pale oblique vitta described in the next species, and there are a few pale points toward the inner apical angle. In this species the outer ulnar nervure is forked close to its base and its inner branch is again forked beyond the middle. It is rather larger than the next and the genital characters are quite distinct.

Stal has described four species in this genus: *Belfragei* from Texas, *suavis*, *nebeculosus* and *ferruginosus* from Mexico, the two latter of which were omitted from the Biologia. Of *nebeculosus* Prof. Wickham has sent me a small but undoubted example taken by him at San Antonio, Texas.

173. **Cyrpoptus Reineckei** n. sp.

Form of *Belfragei* and nearly of the same size but best distinguished by having the posterior one half of the elytra hyaline with its fuscous apex bisected by an oblique hyaline vitta. Length to apex of abdomen 7 to 8 mm.; to tip of the closed elytra 10 to 13 mm

Vertex obviously longer than the pronotum, rounded or but feebly angled before nearly straight across the middle of the basal margin; median line with a broad sulcate carina. Front as in the allied species transverse, longitudinally striate, sides sinuated, apex concavely arcuated. Pronotum very feebly emarginate behind, truncate before; median line carinate; disk either side with a round impressed dot. Scutellum ecarinate or nearly so, marked with two impressed marginal points before the apex. Elytra long obliquely truncated but not as strongly narrowed there as



CYRPOPTUS REINECKEI

in *Belfragei*, the outer apical angle rounded; costa feebly sinuated beyond the middle; inner ulnar nervure twice forked beyond the middle, outer ulnar forked near its base but distinctly farther than in the preceding species, its two branches simple until lost in the confused venation of the apical portion. Postocular tubercle subacute. Anterior femora broadly foliaceous, the intermediate narrower.

Color dull testaceous brown, more or less tinged with ferruginous especially on the base of the elytra; vertex, pronotum and scutellum minutely irrorate with paler; face paler testaceous with a still lighter indeterminate apical band which covers the lateral pleural pieces; anterior and intermediate legs black irrorate with pale; the posterior pale irrorate with fuscous; venter fuscous irrorate with pale or testaceous irrorate with fuscous. Elytra ferruginous or almost coccineous on the basal one half, sometimes obscurely clouded with fuscous in places; apical half hyaline, fusco venose, with a large fuscous cloud at apex which is bisected by an oblique hyaline vitta from the outer angle. In pale examples this oblique vitta is strongly distinguished by an irregular fuscous cloud on either side. Wings coccineous at base, then fuscous for a space and again along the immediate apex, the intermediate surface hyaline with fuscous veins.

Described from numerous examples taken at all places where I collected in Florida but more abundantly toward the south. This species is most closely related to *suavis* Stal but the hyaline areas of the elytra are much more extended, the colors seem to be different as is also the form of the vertex. I believe them to be entirely distinct.

It affords me pleasure to dedicate this fine Fulgorid to Mr. Ottomar Reinecke of this city, an experienced collector of the Coleoptera, whose enthusiasm and friendly interest during many years acquaintance has been an inspiration to me in my insect studies.

Subfamily Dictyopharinæ.

174. **Dictyophara lingula** VanDuzee.

One example swept from a tall wiry grass near the river at Estero. This species was described last year from material taken by me in New Jersey and a Florida specimen received from Mrs. Slosson.

I took the young of one other species of *Dictyophara* in Florida but these are too immature for me to fix the species.

175. **Scolops desiccatus** Uhler.

Crescent City and Sanford; two examples only. One larva, perhaps of this species, was taken at Sevenoaks.

176. **Phylloscelis atra** Germar.

Taken occasionally at St. Petersburg, Sevenoaks, Ft. Myers and Estero.

177. **Phylloscelis pallescens** Germar.

Not uncommon among the sparse grasses and low huckleberry bushes on the pine barrens at Estero.

Subfamily Tropiduchinæ.

178. **Pelitropis rotulata** Van Duzee.

Six examples of this interesting insect were beaten from bushes at Ft. Myers and Estero. These specimens are pale testaceous and only slightly tinged with green.

Subfamily Achiliinæ.

179. **Catonia picta** VanDuzee.

Estero; two examples. In these the general color is rather more ferruginous than testaceous, becoming darker on the scutellum and base of the elytra and almost piceous on the front where there are two rather narrow transverse white vittæ. The broad transverse pale band on the elytra also is nearly obsolete. Otherwise they do not differ from the type which was from New Jersey.

Subfamily Cixiinæ.

180. **Bothriocera undata** Fabricius.

A small dark form probably of this species was taken everywhere I collected in Florida. At Crescent City I found a pale variety abundant among ferns and weeds in a dark shady copse near "lover's lane" on the Miller estate. I also took this pale form at Sevenoaks but elsewhere I found only the darker fuscous form.

181. **Oliarus vicarius** Walker.

Not uncommon in the barren pine woods at Estero and less frequent at Ft. Myers, St. Petersburg, Clearwater and Sevenoaks. In this species the female is larger, reaching a length of 9 mm. at times, and is much more strongly marked than are the males. In fully colored examples the disk of the mesonotum is much paler or almost rufotestaceous, there is a broad fuscous band across the middle of the elytra and a larger fuscous cloud at apex either of which may be represented by two rows of broken spots.

182. **Oliarus complectus** Ball.

St. Petersburg, Sevenoaks and Estero. Much less abundant than *Oecleus decens* Stal which it much resembles.

183. **Cixius dorsivittatus** VanDuzee.

Crescent City; one example. This specimen is less strongly colored than was the unique type taken by Mrs. Slosson in Florida. It is a very distinct species that need not be confounded with any other now known from our country. I described it as *Cixius dorsalis* in the Proceedings of the Academy of Natural Sciences of Philadelphia for December 1907, but as that name proved to be preöccupied I have changed it to that here used.

184. **Oecleus decens** Stal.

Abundant at all places especially toward the southern end of the state.

185. **Myndus Slossoni** Ball.

I found this pretty species in great abundance on the prairies at Haw Creek near Crescent City, and more rarely at other localities. It shows much variation in the extent of the pale "saddle" on the dorsal line of the elytra. The head, pronotum and scutellum are always deep piceous or black.

186. **Myndus enotatus** n. sp.

Very near *Slossoni* and perhaps but a variety of that species. Color soiled yellowish testaceous, almost uniform above or a little darker toward the costal base of the elytra and on the sides of the scutellum; abdomen and beneath quite strongly tinged with fulvous or at times almost rufous; tergum more or less blackish at base. Eyes, oviduct, and hind margins of the meso- and meta-pleura at times, black. Costa narrowly whitish. Length 4 mm.

Described from numerous specimens. This form was swept from the grass on the prairies at Haw Creek in untold thousands and in lesser numbers at other localities farther south. *Enotatus* is very close to *Slossoni* with which it occurred but the characters separating them seem constant. The front is narrower basally, the expanded divergent apices of the plates in the male genitalia are smaller and narrower, and are distinctly whitish, and the stiles are longer.

187. **Myndus lunatus** n. sp.

Female: Pale straw-yellow or testaceous-yellow varied with white and fuscous. Head rather longer than in most of our species. Vertex long, whitish, its margin strongly carinate, fulvous, slenderly lined with fuscous. Front unusually broad, rapidly widening almost to the straight deeply impressed clypeal suture, its thin exanded sides broadly reflexed and rounded to the base of the clypeus; greenish white in color and marked with a narrow transverse fulvous band at base and a broader one at apex, the latter outlined above by a fuscous or black lunate vitta which may be much extended over the fulvous area; clypeus pale green marked with fuscous or black on either side at base. Pronotum narrow, subangularly emarginate behind, marked with an angular black spot behind either eye and a similar spot below the lateral margin. Eyes black superiorly. Ocelli rufous. Scutellum varied with fuscous on either side, the disk pale between the prominent straight carinæ. Elytra varied with fuscous, the most conspicuous marks being a large basal area containing a whitish cloud, a vague vitta beyond the middle, and the apex; the claval suture and one or two of the principal longitudinal nervures lined with fuscous. In fully colored examples there is a fuscous or black spot on the middle of the clavus at the junction of the nervures, another on the costa opposite this, one on the base of the stigma, a larger one behind a white mark on the tip of the clavus, a spot on the transverse veinlet at base of the second apical areole, and a point anterior to this. Nervures obsoletely punctate but not dotted. Body beneath whitish varied with fuscous on the sides of the venter; oviduct fuscous or black. Legs pale, the femora fuscous exteriorly. Length nearly 4 mm.

Male: A little smaller than the female. Pale straw yellow becoming fulvous on the sides of the scutellum and abdomen. Vertex and face greenish white, the front showing two transverse fulvous vittæ but wanting the fuscous markings found in the female. Elytra without the fuscous markings but showing a white subapical cloud and the black points as described in the female, those on the clavus and costa much reduced or obsolete.

Described from numerous specimens swept from low huckleberry bushes and accompanying weeds and grasses on the dry pine barrens at Sanford, Sevenoaks, Ft. Myers and Estero. This is a very pretty little species distinguished by the broad greenish front banded with fulvous and marked with a fuscous lunule in the female. In one female the fuscous markings of the elytra form a large blackish cloud on the base of the clavus and an elongated mark on the disk of the corium posteriorly against the claval suture.

188. **Myndus pusillus** n. sp.

Allied to *radicis* Osborn but much smaller with a narrower and immaculate front. Female: Vertex rather wider than in the allied species, its carinate sides almost parallel. Front moderately broad, distinctly convex in both diameters, strongly carinate. Eyes fuscous. Pronotum very short, the broadly and deeply emarginate hind edge attaining the base of the vertex. Vertex and pronotum pale greenish, the latter with a black mark on either side beneath the eye. Face dull fulvous with whitish carinæ. Scutellum fulvous. Tergum more or less embrowned. Beneath pale, tinted with fulvous on the pectoral pieces. Elytra hyaline, immaculate, the nervures obsoletely punctate.

Male smaller than the female and without the blackish marks behind the eyes, front greenish white like the vertex. Length 3½ to 4 mm.

Described from one female taken at Crescent City and two males from Sevenoaks. This is the smallest and most delicate Cixiid known to me. It is closely related to *viridis* Ball but is much smaller; the vertex is broader and shorter, scarcely surpassing the eyes; the front is wider at base and fuller and more convex in both diameters; the elytral nervures are more strongly punctate and are obviously infuscated toward the apex; the pygofers of the male genital segment are more produced dorsally so the apical margin is strongly oblique, and the tergum is distinctly marked with blackish.

Subfamily Issinæ.

189. **Bruchomorpha pallidipes** Stål.

Of this species I took a small male at Crescent City and a large female at Estero. The female has the anterior and intermediate legs pale brown and the posterior black with pale knees. In the male the legs are fulvous.

190. **Bruchomorpha suturalis** Melichar.

The species I place under this name I found common throughout Florida. In the form of the head it is intermediate between *pallidipes* and *tristis*. In the extent of the pale dorsal vitta these individuals vary as do those of *tristis* from a mere indication on the vertex to a broad conspicuous vitta to the apex of the scutellum. In none does this pale vitta attain the tip of the elytra as described by Melichar and as found in Colorado material in my collection, but this character seems to be subject to much variation.

191. **Bruchomorpha tristis** Stal.

Crescent City, Sevenoaks, St. Petersburg and Estero. I distinguish this species by the short nearly vertical head. These specimens differ from Stal's description in having a pale dorsal line on the vertex and generally on the pronotum and scutellum but as stated above I believe this character to be subject to variation and not of specific value. Melichar mentions a similarly marked example from Texas. The St. Petersburg specimen is macropterous and has the elytra a little longer than the abdomen; hyaline with the transverse and apical nervures fuscous, those toward the base pale. In some examples the surface about the insertion of the coxæ is fulvous or pallid; occasionally the anterior and intermediate feet are pale brown and the posterior black with pale knees. In others the legs are almost entirely black. I have taken this species in Colorado and at Niagara Falls.

192. **Bruchomorpha jocosa** Stal.

This very distinct species I took at Crescent City, Sanford, Sevenoaks, St. Petersburg, Tampa and Ft. Myers. Here the head is even shorter and more vertical than in *tristis.* Normally the base of the clypeus is black beneath and there is a broad fuscous ray on the disk of the elytra which is continued as a curved vitta to the tip of the abdomen. Some of my specimens are darker while one is entirely rufo-testaceous. Four have the fuscous color deepened to blueblack and agree in every respect with Stal's description.

193. **Naso Robertsoni** Fitch.

One pair of this rare insect was swept from a fine grass in a clearing in the pine forest at Estero.

194. **Aphelonema decorata** VanDuzee.

Taken at Crescent City and St. Petersburg. The bright fulvous and blue-black colors of this species give it a strong superficial resemblance to *Bruchomorpha jocosa* but its generic characters will at once distinguish it.

195. **Hysteropterum punctiferum** Walker.

Swept from the sparse vegetation of the interminable pine barrens everywhere I collected in Florida. At Crescent City they were rare and here and at Sanford where they occurred in numbers they were mostly of the unicolorous form described both by Walker and Uhler. Farther south they became abundant and were marked with brown and fuscous. In fully colored examples from Estero these markings remind one much of those seen in genus *Gelastocoris.*

196. **Thionia simplex** Germar.

I swept three examples of this insect from a grassy field near the shore between Sevenoaks and Green Springs.

Subfamily Acanaloniinæ.

197. **Amphiscepa bivittata** Say.

Estero; three examples. These are smaller and paler than those taken farther north.

198. **Amphiscepa pumila** VanDuzee.

I took a good series of this pretty little species on Estero Island. They were swept from a peculiar succulent plant growing along the shore near the line of high tides. The males are but 3½ mm. in length and both sexes are of a uniform clear pea green with the apical margin very slenderly brown in the male and alternated with brown in the female. Immature specimens are brownish testaceous more or less touched with green according to age, and the specimen taken by Mrs. Slosson from which the species was described was probably in this condition as it had not attained the full green coloring.

199. **Acanalonia latifrons** Walker.

Tampa, Ft. Myers and Estero. At Ft. Myers it was not uncommon. The specimens taken by me agree in every respect with the descriptions by Walker and Melichar except that the scutellum shows the two black points found in the South American *florea.* My specimens vary from 9 to 12 mm. in length. This species is quite distinct specifically from the single specimen taken by me in Jamaica and listed as *Servillei* in my report on those Hemiptera. That specimen like these however shows the two black points on the scutellum which are not noticed by either Melichar or Spinola.

Subfamily Flatinæ.

200. **Ormenis pruinosa** Say.

Sevenoaks and Estero. This species was abundant at all places where I collected in Florida. In the northern portions of the state only larvæ were found but at Estero adults were fairly abundant although imperfectly colored.

201. **Ormenis rufifascia** Walker.

Ft. Myers and Estero, not uncommon; Clearwater, one example. In fully colored individuals the head, pronotum and scutellum are deep green with two broad approximate deep orange longitudinal vittæ which reappear further down on the face; the face is also bordered with orange basally. The sides of the scutellum are pale fulvous as are also the inner and apical margins of the elytra. On the elytra there is but one distinct subapical line of transverse veinlets but a second line is fairly well indicated. This species has the size and general outline of *septentrionalis* but the apical angles of the elytra are more rounded.

202. **Cyarda Melichari** Van Duzee.

Common everywhere in Florida. I found it especially abundant on the dry prairies at Haw Creek near Crescent City and but little less so throughout the monotonous pine forests that cover nearly the whole state. As pointed out by me last year (Proc. Acad. Nat. Sci. Phila., xix, p. 496,) this is distinct from the *Cyarda* taken by me in Jamaica which I now identify as *acuminipennis* Spinola.

203. **Flatoides punctatus** Walker.

Taken occasionally on trees and bushes at all places where I collected in Florida. Most of these specimens are quite strongly tinged with green but some are more testaceous and all when fresh are covered with a gray powder which renders them inconspicuous on the whitish trunks of certain trees on which they most frequently rest.

In Jamaica I took a species which I formerly identified as *Dascalia grisea* Fabricius but I am now convinced that that was an error and that the species is really the *Dascalia acuta* of

Uhler. which pertains to genus *Flatoides* Guerin and is closely related to *punctatus* Walker. In these species the vertex is nearly or quite as long as the pronotum and distinctly angled. I have separated *acutus* from *punctatus* by its smaller size, the blunter apex of the head and the trispinose posterior tibiæ, but these species are very closely related and may not be distinct. *Flatoides lichenosus* Melichar seems to differ only in the dark atoms sprinkled along the nervures of the elytra. It is probable that the Florida specimens noticed by Dr. Uhler under *acutus* pertain to *punctatus* as separated here. Walker's *Elidiptera punctifera* has a very short vertex, according to his description, and may belong to my genus *Eurocalia*.

The forms of *Flatoides* allied to *punctatus* constitute a very puzzling group of species which was placed in *Cyarda* by Stal in 1862 but not in 1866, and in *Dascalia* by Uhler. Stal in 1866 distinguished *Dascalia* from *Flatoides* and its allies by its having the longitudinal nervures of the elytra united by two series of transverse veinlets and at and beyond these simple and parallel; while in *Flatoides* there is at most but one regular series, and the longitudinal nervures are more or less furcate to the apex. As thus distinguished *Dascalia* would include *Elidiptera punctata* Walker and its allies but Melichar adds to the characters named by Stal the short transverse vertex and nearly vertical elytra which have their apical margins in contact for most of their width. As Melichar has studied most of the species listed by Stal under *Dascalia* it seems but reasonable to accept his limitations for the genus. This would necessitate the placing of *Dascalia acuta* and *guttata* of Uhler and *Elidiptera punctata* of Walker in *Flatoides* along with *fuscus* Van Duzee, *liehenosus* Melichar, *griseus* Melichar, *signatus* Melichar and *tortrix* Guerin, in a little group of species which must be considered as typical as it includes Guerin's type species. In his synoptic table of 1866 Stal rightly defines genus *Cyarda* but unwarrantably places his own name after it as authority and misled by this Kirkaldy has renamed "*Cyarda* Stal, 1866" as *Gelastophantia* which name must therefore fall as a synonym of *Cyarda* Walker. If the large genus *Flatoides* has to be dismembered, as is not unlikely, the southern forms with a more simple elytral venation, and including my *monilis* from Jamaica, will have to be renamed unless *Phalænomorpha* A. & S. should prove to be available for this group.

Subfamily Derbinæ.

204. **Otiocerus Degeeri** Kirby.

Sevenoaks; one strongly colored example.

205. **Cenchrea fulva** n. sp.

Very closely allied to *Heidemanni* Ball but with a narrower and more deeply channeled front. Elevated margins of the vertex as high as the width of its carinate base. Front distinguished from the vertex by a slight angle but the dividing line not at all carinate; narrow, but little broader at apex; the edges greatly elevated; middle line feebly carinate. Eyes vertical, sinuated behind and strongly narrowed below. Second joint of the antennæ large, ovate, but not nearly attaining the margin of the post-ocular cavity in which it stands; setæ short, black. Pronotum shorter than the dorsal aspect of the vertex, angularly emarginate behind; on either side produced in a semicircular auriculate cavity for the reception of the antennæ; the elevation of the posterior wall of this cavity is about equal to the length of the pronotum. Mesonotum transverse, convex, polished and very obscurely tricarinate on the disk; the obtuse triangular apex depressed. Elytra long and narrow; the outer claval nervure distinctly granulate. Genital plates of the male with their inner margins strongly toothed at the middle leaving a rounded opening at base and an oblong one apically. Length to tip of the abdomen 3½ mm.; to apex of the closed elytra 6½ mm.

Color obscure rufo-fulvous, deeper on the abdomen and paler or subtestaceous on the elytra; eyes, slender edge of the facial carinæ and stiles of the male black. Wings and plates of the male whitish, the nervures of the former brownish; apical margin of the elytra slightly enfumed and very minutely serrate.

Described from one male taken at Estero. This large species may readily be distinguished by its pinkish color. It differs from the closely related *Heidemanni* Ball by its narrow and deeply sunken vertex and front and the fulvo-testaceous elytra. It has a much more produced vertex than *Uhleri.* Our dark slate colored Lamenias differ from these species in having a shorter and broader vertex which is separated from the front by a transverse carina which is sometimes obscure, and in having the margins of the front and vertex much less elevated and the elytra shorter. My *Lamenia flavida* from Jamaica is strictly intermediate between these genera.

206. **Lamenia obscura** Ball.

Taken at Crescent City and Haw Creek. Unfortunately only females were brought home so I cannot be certain of this identification but the specimens agree in almost every particular with the general characters given by Dr. Ball and as the species is evidently distinct from *vulgaris* and is from one of the type localities of *obscura*. I think there can be little risk of error in placing it with that species. Dr. Ball confirms my determination in so far as that is possible with the poor condition of my material.

Subfamily Delphacinæ.

207. **Stenocranus saccharivorus** Westwood.

One example taken at Tampa. So far as I know this is the first recorded occurrence of this pretty little geen insect within our territory. It is common in the West Indies.

208. **Stenocranus dorsalis** Fitch.

Not uncommon at Crescent City and Sanford. These specimens are as dark and clearly marked as are any found in the northern states. One male is smaller and paler but probably not distinct.

209. **Stenocranus palaetus** VanDuzee.

Crescent City; eight examples. The long vertex, soiled brown color and large tibial spurs will readily distinguish this species.

210. **Megamelanus elongatus** Ball.

Crescent City; not uncommon on a tufted marsh grass growing on the borders of Lake Stella and on a similar and probably identical grass on the gulf coast at St. Petersburg and Estero Island. Some of the females are almost uniformly soiled straw-yellow with the outer carinæ of the front margined within with fuscous and the oviduct, two or three points on the basal margins of the venter and a small spot at the apex of the middle apical areole of the elytra, black. Sometimes however the sides of the abdomen above and below are quite broadly infuscated. In the males the general color is darker, the abdomen is largely black and the elytra have a fuscous mark at the inner apical angle covering the two inner two areoles and the apex of the third.

With these I took at Estero and St. Petersburg one male and five females which differ in that the females are marked almost exactly as are the males of the paler form, and the single male has nearly the whole lower surface including the face and legs, most of the tergum and the whole apex of the elytra black. I cannot see that these differ structurally from *elongatus* of which they are perhaps a dimorphic form.

211. **Megamelanus spartini** Osborn?

I took at St. Petersburg one male that I place here with some hesitation. It is deep shining black with the vertex, disk of the pronotum and scutellum between the lateral carinæ, the second joint of the antennæ, legs, surface about their insertion, and a spot on the base of the tergum, pale yellowish. The commissural margin unevenly and a large spot at the apex of the costal areole of the elytra white. This white commissural margin is enlarged to a round spot at the apex of the clavus opposite to the costal spot. These markings are quite similar to those described by Prof. Osborn for the male of *spartini*, but the vertex is distinctly longer and the front is narrower and less swollen than in my only specimen of *spartini*, which is a female. Further material is needed to connect the present specimen with *spartini*.

212. **Megamelus marginatus** Van Duzee.

At Estero I took two females of this species in which the frontal carinæ are margined with brown only at the apex of the head. Although not really brachypterous the elytra of these specimens are decidedly shorter than in the fully winged form.

213. **Peregrinus maidis** Ashmead.

Estero; four examples. This species certainly was not common when I was in Florida as I looked carefully for it and found but these specimens.

214. **Macrotomella carinata** Van Duzee.

Crescent City and Ft. Myers; two examples. I took this species in Jamaica and described both the genus and species in my report on that collection. This is its first recorded occurrence in the United States.

215. **Pissonotus marginatus** Van Duzee.

I took one brachypterous female at Sevenoaks which agrees in every respect with material taken in New York.

216. **Pissonotus ater** Van Duzee.

Crescent City, Tampa, Sevenoaks and Ft. Myers. Moderately abundant. Most of those taken were macropterous females.

217. **Pissonotus basalis** VanDuzee.

I took a male at Ft. Myers and a female at Estero which agree in all essential particulars with the male from Columbus, Texas, mentioned in my description of this species and bears a superficial resemblance to *Liburnia puella*.

218. **Pissonotus delicatus** VanDuzee.

Of this species I obtained eight females at Crescent City, Sevenoaks and Estero and one male at Estero. These females vary from almost uniform fulvous to ferruginous with the extreme apex of the elytra and of the front pale. In only two specimens is there any indication of the piceous band on the base of the clypeus. Four other males from Estero and Crescent City are dark castaneous with a black interruption on the pale apical border of the elytra and a strong frontal piceous band. They seem to be but a color variety of this species.

219. **Pissonotus brunneus** VanDuzee.

Crescent City; one brachypterous female.

220. **Phyllodinus nitens** n. sp.

Somewhat allied to *Kœbelei* but with much the aspect of *Pissonotus ater* or *delicatus*. Brachypterous female: head distinctly narrower than the pronotum; vertex quadrate; front moderately wide, slightly convex, highly polished and feebly carinate. Pronotum. short, scarcely carinate. Elytra reaching onto the second abdominal segment, without visible neuration. Anterior tibiæ very broad; foliaceous, about twice the width of the femora. Length 2½ mm.

Color rufo-piceous, darker on the abdomen and anterior tibiæ. Elytra clear rufous with a sharply defined white apex; pronotum, except anteriorly, and the posterior tibiæ testaceous white. Front concolorous.

Macropterous female: Elytra longer than the abdomen, whitish hyaline, narrowly infuscated at base; nervures slender, concolorous, the marginal brown becoming whitish on base of the commissure. Color piceous black, paler beneath; base of the pronotum white; tip of the scutellum fulvous. In both forms the antennæ are pale with the basal joint rufous. In this as in the allied species the scutellum is much larger in the macropterous form.

Described from two female examples: one brachypterous from St. Petersburg and one macropterous from Estero. This species may be distinguished from all its congeners by its uniformly colored front. With *Kœbelei* Osb., *fuscous* Osb. and *flabellatus* Ball, it forms a group of species closely resembling *Pissonotus* and distinguished from the typical species *nervatus* by the much narrower head. The present species is peculiar in being highly polished all over.

221. **Stobæra affinis** n. sp.

Very close to *tricarinata* Say but with a shorter vertex, almost unicolorous face and shorter pronotum. Vertex distinctly shorter than broad, the carinæ and fovæ less prominent than in the allied species. Front scarcely parallel, distinctly narrowed from base to apex in the male. Pronotum not longer than the vertex, the carinæ obscure. Color as in *tricarinata* and *concinna*, fusco-testaceous becoming darker on the sides of the thorax; face obscurely mottled and crossed by a faint lighter band below the antennæ; marked with a minute black point on either lateral carina opposite the lower angle of the eye and another pair on the base of the rostrum. Legs whitish conspicously dotted with fuscous; Elytra whitish hyaline, the white nervures dotted with black and marked with fuscous as in *tricarinata* except that the oblique vitta from the stigma to the inner apical angle is narrower at apex, not widened there after passing the outer oblique vitta. Abdomen mostly pale in the female, more or less blackish in the male. Length to the tip of the elytra scant 4 mm.

Described from four examples taken at Crescent City and Ft. Myers. This species is a little smaller than either *tricarinata* or *concinna* of the former of which it seems to be the southern representative. It has the oblique fuscous vitta found in *tricarinata* but the short vertex and nearly unicolorous front will distinguish it. It is sufficiently distinct from *minuta* Osb. and *concinna* Stal. This latter species has been taken at Biscayne Bay by Mrs. Slosson but I was unable to find it at any of the localities visited by me. It has a longer vertex than *affinis* but shorter than *tricarinata*, the carinæ are sharp and prominent over the apex of the head and the elytra want the oblique vitta at the outer angle. The posterior oblique elytral vitta is broader in *concinna* and covers the apex of the elytra as it does in *pallida* Osborn.

222. **Stobæra pallida** Osborn.

Taken at Crescent City, Ft. Myers and Estero. This is a large species easily distinguished by its sordid fulvous color. Prof. Osborn's description (Ohio Naturalist, v, p. 375, 1905.) will readily identify it.

223. **Stobæra 4-pustulata** n. sp.

Brachypterous form: Pale yellowish testaceous, obscurely varied with darker, marked with a broken black band which crosses the base of the clypeus and sides of the pleural pieces, and with two black pustules on either side of the fourth tergal segment. Length: male 2½; female 3 mm.

Vertex broader and more quadrate with the carinæ weaker than in *tricarinata*. Front long ovate, broader than in *tricarinata*, regularly narrowed at base and apex. Antennæ but moderately flattened, almost as in *Liburnia*. Pronotum short, carinæ rather weak, the lateral almost attaining the hind margin. Elytra reaching the first tergal segment, arcuated at apex. This segment with two polished blunt tubercles on either side placed lengthwise of the segment and near the margin. Pygofers of the male deeply excavated below and showing on either side a longitudinal ridge above the base of the stiles. These stiles slender, sinuated and but little divergent.

Color pale yellowish testaceous, obscurely varied or maculated with a darker shade on the abdomen and marked with black as follows: a spot on the cheeks below the eyes, a band on the tumid base of the clypeus which is continued along either side as a row of large blotches on the pleural pieces, a dot or broken line on the front of the first antennal joint and a heavier line behind, a spot near the apex of the femora and another on the base of the tibiæ, the stiles of the male and the oviduct of the female, and the four polished tubercles on the fourth tergal segment. Elytral nervures dotted with fuscous. Eyes brown. Front with a few dark dots or marks above but not transversely brown at base as in *tricarinata*.

Described from one male and nine female examples, all brachypterous, taken at Estero. This species is somewhat anomalous in any genus. It has the frontal characters and general aspect of *Stobæra* while in the characters of the antennæ and pronotal carinæ it is intermediate between that genus and *Liburnia*. Genus *Stobæra* seems to have been redescribed as *Goniolcium* by Fowler in the Biologia. His *G. granulosum* is perhaps the same as *Stobæra concinna* Stal.

224. **Bostæra nasuta** Ball.

Swept from a fine matted grass growing in slight depressions in the pine forests at Tampa and Sevenoaks. A single specimen was later taken at Ft. Myers. This is an odd looking insect easily distinguished by its very broad Idiocerus-like head and long triangular elytra which are cut off obliquely at apex with the inner angle a little produced. In these specimens the color is ivory white inclining to fulvous on the scutellum in some examples. The elytra are whitish hyaline with white nervures ornamented with concolorous granules which become conspicuous on the V-shaped apical fuscous vittæ. The lower surface is whitish marked with fuscous on the pleural pieces and coxæ; the anterior and intermediate feet lineated with fuscous. Posterior femora short, unarmed. The types were from Colorado.

225. **Liburnia Slossoni** Ball.

Crescent City and Estero; four examples. A large and distinct species somewhat allied to my *dorsilinea* from Jamaica but readily recognized by the two slender longitudinal black lines in the pale dorsal vitta.

I see my friend Kirkaldy still persists in calling this genus *Embolophpora* Stal but I am unable to discover any justification for so doing. If the type of *Embolophpora* could possibly be placed in this genus his course would necessarily be right but by Stal's description of both the genus and species it is evidently very distinct and should we supplant *Liburnia* by *Embolophpora* we must at once establish another genus for the African type of *Embolophpora* which of course could not be done. The fact is Stal merely replaced the old name *Delphax* Auct. by *Liburnia* and left under it all the group of species at that time generally placed under that name, including his own *Embolophpora* as one extreme of the series on account, probably, of the long-produced head. I still think that *Liburnia* should stand for that group of species allied to *pellucida* Fabricius, which should perhaps be considered its type.

226. **Liburnia laminalis** Van Duzee.

Crescent City, two macropterous females. These are a little larger than the types from Mississippi. One brachypterous male taken with the preceding is very much smaller but I believe it belongs here. I have taken this species at Hamburg and Phoenicia, N. Y. and Columbus, Ohio. These specimens are smaller than those from Florida.

227. **Liburnia Weedi** Van Duzee.

At Sanford I took one male and at Crescent City four females of this species. The macropterous female is 5 mm. in length and has the abdomen concolorous with the segments edged with black. In the brachypterous females the tergum is brown with three whitish longitudinal lines, the lateral bordered below with fuscous beyond which are some pale and fuscous markings. This is a large species recognizable by its dark testaceous-brown color and the heavy fuscous nervures toward the apex of the elytra.

228. **Liburnia humilis** Van Duzee.

At Sanford and St. Petersburg I took a series of brachypterous males and females and macropterous females. The latter are larger and darker than the types which were from Jamaica. Two small brachypterous females from Estero are considerably paler but I believe they belong here.

229. **Liburnia puella** Van Duzee.

Crescent City and Sevenoaks, not uncommon. This little species seems to be pretty generally distributed in North America and Mr. Kirkaldy has recently reported it from Australia.

230. **Liburnia basivitta** n. sp.

Small; blackish fuscous with a narrow black front and marked with bright fulvous on the base of the abdomen. Length 2 mm.; to tip of the elytra 3 mm.

Macropterous form: Vertex narrow, nearly square; fovæ distinct; median carina prominent over the apex. Front narrow, a little constricted at base; sides nearly rectilinear; carinæ strong. Pronotum short; sharply carinate. Mesonotal carinæ distinct, the lateral slightly divergent posteriorly. Pygofers of the male less excavated below than in *puella;* stiles slender, curved away from one another; but moderately separated.

Color fuscous brown to black. Front always black with the carinæ slenderly brownish; carinæ of the vertex and sometimes of the pronotum paler in black specimens. In pale specimens the pronotum is mottled with pale and the cheeks and pleural pieces are brown. Metapleura pale or fulvous with a large fuscous spot on either side. Legs pale brown. Antennæ black; second joint pale except at base. Abdomen dark brown or black, the first dorsal segment fulvous which color sometimes invades the second segment, and beneath there is a fulvous spot on the middle of the first two segments. Elytra whitish hyaline with the nervures fuscous toward their apex, the marginal heavy.

Described from numerous specimens taken about Buffalo, N. Y., at Ridgeway, Ont., Milan, Ohio, and one macropterous female from Crescent City, Florida. This is a small plainly colored species closely allied to *puella*. It has the same form of front, vertex and pronotum and the same fulvous band on the abdomen frequently found in that species. It wants the distinct black and white coloration and the black commissural line, and the genital characters are quite distinct. The antennæ also differ in being black at base, not entirely pale as in that species. In the brachypterous form the elytra sometimes attain the apex of the abdomen and the colors are apt to be paler.

231. **Liburnia albolineosa** Fowler.

Sevenoaks and Estero. The seven examples taken are all males and differ from those taken by me in Jamaica in having the vertex, frontal carinæ and clypeus whitish and the elytra are mostly hyaline.

232. **Liburnia seminigra** Stal.

I swept this species in large numbers from the lawn on the Hubbard Estate at Crescent City. The females which were taken with the males are entirely of a pale straw color with the eyes and oviduct black and are nearly twice the size of the males. A single male example was taken at Estero. The types were from Brazil and I have taken it in Jamaica.

233. **Liburnia Andromeda** Van Duzee.

I took one brachypterous male at Sevenoaks and a macropterous male at Tampa. In the latter the orange parts are dull ferruginous varied with fuscous and the elytra are hyaline with the nervures punctate, the marginal heavy and fuscous. A beautiful little species the types of which were from Jamaica and British Guiana.

234. **Liburnia ornata** Stal.

Crescent City; two examples. These specimens are somewhat smaller than those from the northern states.

235. **Liburnia circumcincta** n. sp.

Whitish testaceous sometimes tinged with fulvous on the abdomen which is marked with fuscous; front rather broad at the middle, concolorous, the white carinæ edged with black. Length: male 2; female 3 mm.

Brachypterous form: Vertex well advanced before the eyes, rather longer than broad; foveæ distinct, the apical long and continued well over the anterior edge of the head. Front moderately broad, strongly narrowed between the eyes and slightly at apex, carinæ strong, Pronotum unusually long, produced a little before the middle of the eyes; lateral carinæ closely following the posterior margin of the eyes. Scutellum about the length of the pronotum; carinæ strong, divergent. Color whitish testaceous, a little tinged with yellow or even fulvous on the abdomen and front; facial carinæ white; the apical areole of the vertex, clypeus and slender margins of the frontal compartments black. Tergum of the male marked with black on its immediate base and across the middle and with a black median spot on the fulvous basal half; end of the genital segment, a spot on either side of the last ventral segment and another on the metapleura black; anterior and intermediate legs lineated with black. In the female the abdomen is more brownish-yellow marked with black on the sides of the tergum, edges of the ventral segments and along the oviduct. Legs and lower pleural pieces marked as in the male. In both sexes the disk of the pronotum and mesonotum are paler than the rest of the surface. Pygofers of the male genital segment broadly subangularly arcuated at apex; the stiles stout, widely divergent and a very little wider toward their truncated apex.

Described from two male and four female examples taken at Crescent City and St. Petersburg. One macropterous male differs in being smaller, in having a narrower front not abruptly constricted between the eyes, a shorter vertex and more approximate and scarcely divergent mesonotal carinæ. It also has the elytra a little embrowned toward the apex where the nervures are darker. The genital characters are the same and it probably belongs here. I have also placed here two macropterous females taken by Mrs. Slosson at Biscayne Bay and Lake Worth. They are large, 2½ mm., have the tergum mostly black and the elytral nervures fuscous toward their apex, the marginal especially heavy and fuscous.

Family Cercopidæ.

236. **Tomaspis bicincta** Say.

Sanford and Ft. Myers.

237. **Lepyronia angulifera** Uhler.

Found in moderate numbers at all places where I collected in Florida.

238. **Aphrophora saratogensis** Fitch.

Crescent City; one example.

239. **Clastoptera proteus** *var.* **flava** Ball.

Crescent City; one example only.

240. **Clastoptera proteus** *var.* **vittata** Ball.

A single example taken at Sevenoaks.

241. **Clastoptera xanthocephala** Germar.

Abundant everywhere in Florida. Most of the specimens taken are of the typical black form as described by Germar but I took a few of the pale glaucous form. Both forms varied much in depth of coloring and in size from 3 to 4 mm.

Family Membracidæ.

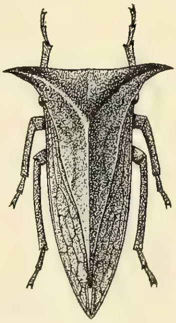
242. **Ceresa brevitylus** VanDuzee.

I took a good series of this species at Crescent City and Sanford all but one of which were females. They agree in wanting the black marks on the pectus and femora. In my description the length of this species was inadvertently omitted. It is for the male 6 to 6½ mm, and for the female 7 to 7½ mm. The short recurved horns, convex metopidium and short tylus will distinguish the species.

243. **Ceresa aculeata** n. sp.

Allied to *taurina* but easily distinguished by the short tylus and the feebly emarginate last ventral segment in the female. Length 8 mm.

Face uneven, most of its surface covered with longitudinal; curved or somewhat oblique rugæ fading into vague punctures about the clypeus; anterior margin regularly arcuated, obtusely emarginate next the short and broad clypeus which when viewed from before but little exceeds the line of the cheeks and is clothed with a few stiff hairs at the rounded apex; when viewed from the side the median line is nearly straight. Sides of thc metopidium moderately divergent to the long horizontal


CERESA ACULEATA

and very acute suprahumerals. When viewed from above the line of the metopidium is feebly bisinuate exactly as in *taurina*, the middle being slightly convex leaving a sinus at the base of either horn; the suprahumerals slightly recurved. Pronotum well arched above with a distinct semicircular impression: rather short and depressed with a very slender and acute apex which attains the middle of the upper anteapical areole. Last ventral segment short with a shallow emargination, either side of which the margin is a little convex.

Color dark green becoming more or less fulvous in the dried specimen; suprahumerals, a vitta from their base to the humeral angles and the dorsal carina including the attenuated apex rufocastaneous, becoming piceous or black on the tips of the horns and slender apex; Tylus with a brown mark on either side next the rounded apex of the cheeks.

Described from three females taken at Estero. This species has the aspect of *taurina* but is readily separated by the characters given above. It may be a West Indian species but I can find no description that answers to it at all. It is very distinct from *vitulus*.

244. **Stictocephala festina** Say.

Crescent City and St. Petersburg. This species seemed to be rare and local. It evidently pertains to the more northern Carolinian fauna.

245. **Stictocephala substriata** Walker.

Abundant everywhere I collected in Florida. In some examples the sternum and legs are concolorous while in the other extreme of variation they are quite broadly spread with black.

246. **Acutalis semicrema** Say.

Another abundant species taken at all stations and exhibiting every gradation in marking from a uniform pale green to almost entirely black above.

247. **Micrutalis calva** Say.

Generally distributed in the state but less abundant than the preceding and exhibiting the same range in color markings, among which occurs the variety named *illinoiensis* by Goding.

248. **Telamona monticola** Fabricius.

Sevenoaks; one example beaten from an oak tree.

249. **Telamona** sp.

I secured one specimen at Tampa that I have been unable to place to my satisfaction. It is nearest to *declivata* but the dorsal crest is longer and the apex of the pronotum is less produced.

250. **Archasia galeata** Fabricius.

Five examples of this remarkable looking insect were beaten from low oak bushes at Estero.

251. **Cyrtolobus ovatus** VanDuzee.

At Sanford I took one example of this species and at Estero eleven, all females. These agree in every particular with the type from Atlanta, Ga., except that they average a little smaller. They were found on low oak bushes growing in the clearings along Estero River.

252. **Cyrtolobus** sp.

Clearwater; one specimen captured at electric light in the evening.

253. **Ophiderma salamandra** Fairmaire.

Tampa and Sevenoaks: three females.

254. **Ophiderma flavicephala** Goding.

Estero; two females.

Idioderma n. gen.

Form of *Ophiderma* with the elytral venation of *Vanduzea* nearly. Pronotum greatly depressed; transversely broadly rounded, dorsal outline almost rectilinear, impunctate, apex well surpassing the tip of the abdomen; surface coarsely punctured and short hirsute but polished. Head very short and broad, Elytra hyaline, becoming coriaceous and punctured at the extreme base of the costal areole only; base of the corium with two long nervures; one large basal areole followed by two anteapicals; terminal (third apical) areole short, nearly transverse, long-stylate, its basal nervure feebly angled; second apical divided into two by a transverse nervure.

This genus is intermediate between *Ophiderma* and *Vanduzea* but the elytral venation allies it unquestionably with the latter, immediately before which I would place it in a linear arrangement. *Virescens* is the type.

255. **Idioderma virescens** n. sp.

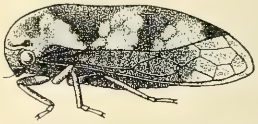
Clear bright green with the head and legs more or less rufous. Length 4½ to 5 mm.

Head about twice wider than long; margin of the cheeks sinuated, a little rounding to the base of the broad clypeus the apex of the latter tumid and moderately incurved. Pronotum almost attaining the tip of the terminal areole; its median line impunctate but not at all carinate, its base feebly arcuated. Color of the pronotum clear bright green; head and legs usually bright rufous, sometimes pale, the face at times exhibiting traces of a transverse fuscous vitta below the ocelli and another across the apex of the clypeus; tibiæ and tarsi becoming greenish apically; abdomen pale yellowish green, brighter in places especially on the tergum; oviduct of the female rufous; stiles of the male slender, recurved and black at apex.

Described from numerous examples of both sexes. It was taken occasionally at all places where I worked but most abundantly at Estero. The brilliant green and red of this little insect makes it a really beautiful object when it is resting in the bright sunshine. I at first imagined this to be the *Acutalis inornata* of Ball but closer inspection showed the clavus and part of the corium to be covered by the pronotum thus excluding it from that subfamily.

256. **Idioderma varia** n. sp.

Bright rufotestaceous varied with lighter and darker shades; face with the apex and a transverse band below the ocelli fuscous. Length 4½ mm.



IDIODERMA VARIA

Face as in *virescens* but with the disk of the clypeus a little more elevated; dorsal line of the pronotum feebly sinuated at the middle; its apex reaching about to the base of the terminal areole. Color some shade of rufotestaceous varied on the pronotum as follows:—a large subtriangular pale spot above each post-humeral sinus, which obscurely unite in a vague anterior dorsal cloud; a broad transverse paler vitta behind the middle and another before the apex both of which are broadest at the sides and become indefinite dorsally; the margins of these light areas are eroded and intensified by a darker, almost fuscous, shade. Viewed from above these darker shades form a roughly rhomboidal figure, a transverse vitta and a dusky tip, and above each eye is a darker spot or cloud. Face pale with a transverse vitta below the ocelli and another on the apex. Beneath and the abdomen pale yellowish green with the posterior femora, an annulus on the anterior and intermediate femora, a broken lateral vitta on the pleural pieces and the apex of the stiles of the male black. Elytra hyaline; the apical nervure a little embrowned.

Described from one male taken at Estero. This insect has somewhat the aspect of a slender depressed *Vanduzea* but the elytral venation will distinguish it. It seems hardly conceivable that it should be but a color variety of the preceding. When viewed from above the markings have much the aspect of Emmon's figure of *Gargara discoidalis* as given in the Insect volume of the Natural History of New York; plate 13, fig. 4.

257. **Vanduzea vestita** Goding.

Taken at St. Petersburg, Estero and Sevenoaks; apparently rare. At Sevenoaks I swept three examples from a coarse weed growing in a grassy shaded copse on Mr. Hoyt's farm.

258. **Entylia sinuata** Fabricius.

Crescent City, Sanford and Ft. Myers. Five dark colored males and one pale female were taken.

259. **Entylia concisa** Walker.

Crescent City; two females.

260. **Platycotis sagittata** Germar.

Crescent City and Sevenoaks; beaten occasionally from various trees and bushes. These all have the porrect horn but it varies much in length in the different individuals.

261. **Tylopelta brevis** VanDuzee.

Crescent City; two males and one female. These agree in all respects with the types which were from Florida.

Family Bythoscopidæ.

262. **Macropsis robusta** Uhler.

Sanford and Ft. Myers; two examples.

263. **Agallia novella** Say.

Crescent City; not common. These specimens are much smaller than those from the north and are scarcely larger than the form I took in Jamaica and described as variety *tropicalis.*

264. **Agallia constricta** VanDuzee.

Common at Crescent City and Sanford but not found at the southern end of the state.

265. **Agallia sanguinolenta** Provancher.

Crescent City and Sanford; two examples.

266. **Agallia lyrata** Baker?

Crescent City; one male. The characters of the male genital segment in this example agree exactly with Baker's description but the colors are darker and the markings more distinct. Considering the difference in locality it would not be surprising if this should prove to be distinct.

267. **Agallia deleta** n. sp.

Allied to *constricta* but smaller and unicolorous brown. Length 2½ to 3 mm.

Form of *constricta* nearly, the vertex short as in that species and thus crowding the ocelli low down on the face. Pronotum short, its surface posteriorly coarsely transversely wrinkled and separated from the smooth anterior margin by a sinuated impressed line. Elytra rather long and narrowed posteriorly, about as in *constricta*. Last ventral segment of the female short, truncate behind or a little concavely arcuated; pygofers broad and well inflated at base with their apex less produced than in *constricta* and scarcely exceeded by the oviduct. Valve of the male long and almost truncated at apex; plates very short, broad on their immediate base then abruptly narrowed to a short obtuse apex.

Color brown obscurely tinged with fulvous, almost unicolorous in the female, a little paler beneath. In the male the disk of the tergum and venter are black. the elytra are subhyaline, a little clouded with fuscous toward the apex and discolored by the black disk of the tergum beneath; basal angles of the scutellum sometimes blackish showing through as fuscous marks on the base of the pronotum; basal dots on the vertex sometimes indicated; antennal pits conspicuously black, the sutures of the face at times fuscous below the antennæ. In both sexes the eyes are brown, the tarsal claws are black and the elytral nervures are concolorous but distinct.

Described from four male and two female examples taken at Crescent City, Sanford and Ft. Myers. The males show some obscure lighter marks on the base of the pronotum in addition to the dark spots on the basal angles of the scutellum. The male genital characters are very distinct from those of any other species known to me.

Mrs. Slosson has sent me one pair taken at Belleair which I believe may belong to this species and will in that case slightly modify the above description. In these the ground color is more testaceous with the dark maculation of the head and pronotum fairly distinct, This maculation consists of the median line and two round dots on the vertex and four spots on the disk of the pronotum, the posterior pair more distant with a median oblong spot between them. Exterior to these four spots there is a dark cloud and the elytra are more infuscated than in the typical specimens with the nervures paler. The genital characters are identical with those of the typical form and such a range in coloration is not unusual in this genus.

268. **Idiocerus nervatus** VanDuzee.

Crescent City; two examples. In these the nervures of the wings are not as deep fuscous as is usual in this species.

Family Tettigoniellidæ.

269. **Aulacizes guttata** Uhler.

Ft. Myers; one example. This is the insect identified by Dr. Ball as *Aulacizes pollinosa* Fowler of which I have examined specimens so determined by Dr. Ball. I confess however that I cannot make these agree satisfactorily with either the description or figure of this species given in the Biologia. But this can have no effect on the name here used as the species was well described by Dr. Uhler in the Standard Natural History under this name which, having priority over Fowler's name, must be used even if it be considered but a variety of *irrorata* Fabr. and identical with *pollinosa* Fowler. When publishing my catalague of the Jassoidea I quite unaccountably confused this species with *Tettigonia guttata* Signoret which is a very different insect as stated by Ball. For the present at least I prefer to retain this form as a distinct species. *Irrorata* Fabr. is smaller and darker. I have taken it in Ohio and have seen others from the more southern states.

270. **Oncometopia undata** Fabricius.

Found commonly throughout Florida. At Ft. Myers and Estero most of those taken were of the dark variety; farther north the paler bluish form predominated. I follow Ball in using the name *undata* in place of *obtusa* for this insect, although as he says it may later have to be sunk as a variety of that species.

271. **Oncometopia costalis** Fabricius.

Crescent City, Sanford and Tampa. I found but few specimens of this species and all were of the dark, almost black variety. Fabricius first described this species as *Cercopis lateralis* but in 1803 when he placed his earlier described *Cicada lateralis* in genus *Cercopis* he renamed this *marginella* and discovering that he had already used this name on the preceding page for another *Cercopis*, he again changed it in the "Errata" to *costalis* under which specific name it has since been known. I can see no real gain in the rehabilitation of the old name as has been done by Dr. Ball.

272. **Homalodisca triquetra** Fabricius.

Sanford and Sevenoaks; four examples. *Tettigonia vitripennis* Germar and *coagulata* Say are now considered as synonyms of this.

273. **Tettigoniella occatoria** Say.

Crescent City and Sanford. Taken on rank vegetation in damp places and around the borders of gardens. I found it in a few such restricted localities only, but there it was not uncommon.

Dr. Distant has, it seems to me, finally settled the synonomy of this genus by showing that neither *Tettigonia* nor *Tetigonia* are available and we must therefore fall back upon the name recently proposed by Dr. Jacobi.

274. **Tettigoniella** sp.

At St. Petersburg I took one example of a species slightly resembling *Dræculacephala reticulata* but with the cephalic characters nearly of genus *Tettigoniella*, which as yet I have been unable to determine to my satisfaction.

275. **Kolla fuscolineella** Fowler.

Common everywhere in Florida. This is the same dark form I took in Jamaica which should probably be considered but a variety of *bifida* Say.

276. **Kolla geometrica** Signoret.

Taken with the last but much less abundant. It has a longer vertex and unicolorous green elytra on which are three pale oval spots before the blackish membrane.

277. **Kolla Hartii** Ball.

Ft. Myers and Estero. Still smaller than *geometrica* and with a shorter head. I took two males and two females; the latter were colored exactly like the males instead of being lighter with pale nervures on the elytra. In both sexes the whole insect is deep shining black becoming fuscous toward the apex of the elytra, before which is a subhyaline spot on the costa. The legs and markings of the head are white as described by Dr. Ball.

Kolla similis Walker.

I did not take this species in Florida although Mrs. Slosson has done so. I notice it here to call attention to the fact that Dr. Distant in his Rhynchotal Notes No. 44, reverses this species and *herbida* Walker, claiming that while Walker mixed these two species in his descriptions his types show that our identifications are wrong. These descriptions by Walker are accurate and entirely adequate for the determination of these very distinct species and it is simply a case where the types and descriptions have become reversed, and I cannot see as we have any choice but to follow the descriptions: Otherwise what would be the use of publishing a description at all if the type label alone carries authority? The type must agree reasonably well with the description and I confess I can see no alternative in this case but to follow the nomenclature pointed out by me in 1894 (Ent. News, v. p. 155,) identifying *similis* Walker with the southern form and *herbida* Walker with our northern *Helochara communis.*

278. **Diedrocephala coccinea** Forster.

Crescent City, Sanford and Ft. Myers. These are of the bright scarlet variety described by Say as *4-vittata.* This is the southern form of this species and is represented in my collection by material from North Carolina, New Jersey, Ohio, Kansas and western New York. The larger green northern form was described by Walker as *teliformis* and is found from western New York to the Adirondack Mts. and northwardly to northern Canada. Dr. Ball does not separate this latter from *coccinea* but it is a good variety if not a distinct species.

279. **Diedrocephala versuta** Say.

Taken everywhere in Florida but it was most abundant at Crescent City where I generally swept it from weedy fence rows and the borders of fields.

280. **Dræculacephala mollipes** Say.

Crescent City and Clearwater; not especially abundant.

281. **Dræculacephala mollipes** *var.* **minor** Walker.

Taken in damp places and near water at most localities where I collected in Florida especially toward the southern end of the state.

282. **Dræculacephala 7-guttata** Walker.

Generally distributed but not common in Florida. I follow Distant in considering this as a good species quite distinct from *mollipes*. Its pale straw color marked with seven black points above will readily distinguish it.

283. **Dræculacephala reticulata** Signoret.

This species I took at St. Petersburg and Estero. It has been redescribed as *Diedrocephala flaviceps* by Riley.

284. **Penthimia americana** Fitch.

Taken in moderate numbers everywhere in Florida but it was more abundant toward the southern end of the state.

285. **Gypona cana** Burmeister.

Common everywhere in Florida. Under this name I now place our most abundant and widely distributed species, found from Canada to Florida and west at least to Ogden Utah. It has the eight fulvous vittæ on the vertex, pronotum and scutellum and the elytra are closely reticulated all over. Burmeister says the anterior margin of the vertex is acute at the middle. The vertex in this species is not acutely angled before nor have I ever seen a *Gypona* with such a shaped head. In our species the vertex is more or less obtusely angled and not evenly rounded as in the South American *lineata* with which Burmeister was evidently comparing his *cana*, and I believe that a comparison with his type if that were possible would show that this is the form he was describing. If he meant that the vertex of his *cana* was acutely angled before it could not be a *Gypona* as that character alone would throw it into another genus. Spangberg has evidently redescribed this same species as *flavilineata* Fitch. He describes the vertex as "subangularly produced" which is frequently the case in this species especially in the males I am unable to distinguish between this form and that described by Provancher as *quebecensis*. The latter has a slightly different aspect as it is of a deeper green, is a little smaller, and the fulvous vittæ are almost or quite obsolete. Provancher's species has the elytra entirely reticulated as I know from the examination of a typical specimen sent me by himself at the time he was publishing his Petite Faune Ent. du Canada, although this character was not mentioned in either of his descriptions of the species.

286 **Gypona striata** Burmeister, *variety*.

This form I took with the preceding from which it differs in being of a clearer green color with the elytra reticulated at apex only. It is smaller and darker than the typical *striata* as found farther north and is really intermediate between these two species. The typical *striata* Burmeister was redescribed by Fitch as *flavilineata*.

287. **Gypona** sp.

Sanford and Sevenoaks; two examples. This species seems to have about the same distribution as *cana* but perhaps does not extend its range quite so far north and south. It can readily be recognized by its dark olive green color closely mottled with pale and marked with two black points on the pronotum. It is perhaps the *olivacea* of Spangberg but at present I have not access to his description.

288. **Gypona tenella** Spangberg.

Sanford and Sevenoaks. This is a neat little green species having the elytral areoles without reticulations.

289. **Gypona citrina** Spangberg.

Crescent City and Sanford. A little larger than the preceding and easily recognized by its pale golden brown color with the vertex, anterior margin of the pronotum and scutellum green, and by its having each elytron marked with four minute black points arranged in a square and with a brown cloud on the base of the appendix. The four black points on the elytra are found in a number of allied species and are not distinctive.

290. **Gypona sanguinolenta** Spangberg.

Sanford and Ft. Myers; three examples. This is a large species closely dotted with sanguinous on the vertex, pronotum and scutellum and veined with the same color on the elytra the areoles of which are dotted with black. It is related to *scarlatina* Fitch.

291. **Gypona irrorella** Spangberg.

Ft. Myers; one example. This is another red species but it is smaller than the preceding, has a short vertex and the elytra are marked with coagulated red spots or irrorations.

292. **Gypona** sp.

At Estero I took one example of a small testaceous species allied to *mystica* which I have been unable to identify with any described species known to me.

Family Jassidæ.

Subfamily Acocephalinæ.

293. **Xestocephalus pulicarius** VanDuzee.

Crescent City and Ft. Myers; four examples. Mrs. Slosson has taken *tessellatus* VanD. at Biscayne Bay and elsewhere.

Subfamily Jassinæ.

Tribe Dorydini.

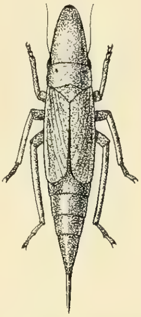
294. **Dorycephalus Vanduzei** Osborn & Ball.

At Clearwater I took one immature example that I feel sure belongs here. It differs from the adults in my collection in having the head longer and narrower at apex. In its larval state this insect has a very long and slender abdomen and altogether bears a striking resemblance to a miniature alligator.

295. **Hecalus apicalis** n. sp.

Brachypterous female: Long and slender posteriorly; apple-green with a small black spot on the extreme apex of the head. Length 14 mm.; of the head 3 mm; width of vertex at base 2 mm.

Head regularly elliptical, very thin; vertex one and a half times as long as its width at base; feebly convex transversely, a little elevated at apex; longitudinally rugose becoming smooth at base. Front moderately convex along its disk, depressed and foliaceous at the sides before the antennæ; clypeus rectangular, scarcely longer than broad. Pronotum transverse, very feebly arcuated before, slightly angularly emarginate behind. Elytra oval, reaching on to the third abdominal segment, costal margin feebly reflexed; clavus with two distant nearly straight nervures. Last ventral segment feebly arcuated behind with a broad triangular median tooth; oviduct exceeding the pygofers by more than one third its length; the latter triangularly produced at apex dorsally.


HECALUS APICALIS

Color dull apple-green slightly tinged with testaceous about the apex of the head at the extreme tip of which there is a blackish spot scarcely visible from above. Eyes, produced apex of the pygofers, and oviduct rufous brown.

Described from two examples taken at Crescent City and St. Petersburg. At Estero I took two larvæ which I refer to this species. They have the head a little narrower anteriorly, and the color more testaceous with three longitudinal lines on the head, pronotum and scutellum. They have the same black mark at the apex of the head that we find in the adult.

A single macropterous male taken at Estero I also refer to this species, but with some doubt. The vertex is shorter than described above for the female as is the rule in the allied forms, and the clypeus is proportionately longer. It has the same black spot at the apex of the head but the markings otherwise are quite different. The color is dark green shaded with brown, there are two parallel brown vittæ from the apex of the vertex, where they converge a little, to the middle of the scutellum, and on either side of these are two more obscure dusky parallel lines; the elytra are brownish hyaline with the nervures darker, those about the outer apical areole heavy and fuscous. Valve wanting; plates long and acutely-triangular; pygofers much exceeding the plates, broadly and deeply forked at apex where they are clothed with long heavy bristles.

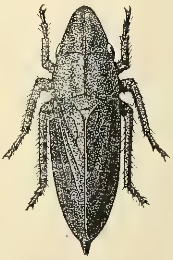
Neoslossonia n. genus.

Allied to *Hecalus* but differing in having the vertex obtusely triangular and furrowed, the pronotum subcarinate and the clavus with two nervures which are united in one posteriorly. Head as wide as the pronotum, obtusely triangular, as long as the width at base, sloping moderately forward in conformity with the slope of the pronotum; vertex almost flat, depressed about the edges; median line with a broad furrow, either side of which is an elevated ridge. Front convex as far as the apex of the head, the margins depressed and nearly foliaceous either side before the eyes; broad, convex and truncated at apex; clypeus abruptly much narrower. Pronotum transverse, a little wider posteriorly; anterior margin scarcely arcuated, hind margin broadly feebly arcuated across the base of the scutellum; median line carinate, either side with a slightly oblique obscure ridge continuing those on the vertex; sides bicarinate behind the eyes. Elytra opake, rounded at apex, the nervures distinct showing five long apical areoles on the corium; the two nervures of the clavus united at about its middle, the resulting nervure joining the commissural a little beyond. Head and pronotum coarsely punctured. Type of genus *N. atra* V. D.

It affords me pleasure to dedicate this genus to Mrs. Annie Trumbull Slosson its first discoverer and one to whom I am indebted for many courtesies extended during the study of this Florida material.

296. **Neoslossonia atra** n. sp.

Deep black all over with the tarsi testaceous and the tibial spines ferruginous. Vertex and pronotum coarsely punctured, those along the margin becoming dragged giving the appearance of rugæ. Convex sides of the front showing curved arcs by oblique light, the depressed margins more deeply punctured. Clypeus longer than wide, sides rectilinear. Elytra reaching nearly to the tip of the abdomen; venation distinct. Valve of the male broad and short, triangular; plates long-triangular, slender and acute at apex, reaching a little beyond the middle of the pygofers; the latter exerted, subcylindrical, armed with four or five short distant bristles on either side. Length 5½ mm.



NEOSLOSSONIA ATRA

Described from two male examples. One of these I took from a "palmetto hummock" at Sanford, the other was taken by Mrs. Slosson at Jacksonville. This remarkable insect has almost exactly the aspect of a narrow Aphrophorid but the position of the ocelli on the edge of the vertex close to the eye will distinguish it. It may readily be recognized by its very black color.

297. **Spangbergiella vulnerata** Uhler.

Crescent City, Sanford, St. Petersburg and Ft. Myers. These specimens, males and females, agree exactly with those taken by me in Jamaica and differ from Signoret's figure in having the scarlet lines on the pronotum converge nearly to a point at the anterior margin, not at all in line with those on the vertex.

298. **Parabolocratus flavidus** Signoret.

Taken at most of the places where I collected but not at all common. This species is very close to *viridis* but the vertex is more pointed; the pygofers of the male are longer and narrow to a point at the apex; the last ventral segment of the female is produced in a short obtuse median tooth, and the venation is a little different as described by Signoret. The type specimens must have been faded as the color of the living insect scarcely differs from that of *viridis*.

Tribe Deltocephalini.

299. **Platymetopius loricatus** VanDuzee.

Sevenoaks, St. Petersburg and Ft. Myers. Occasional. The dark color and pale yellow front will distinguish this from the others here enumerated.

300. **Platymetopius obscurus** Osborn?

Not uncommon at most places where I collected. These individuals have the vertex longer than those from Canada in my collection and they may represent a distinct species.

301. **Platymetopius cinereus** Osborn & Ball.

Taken occasionally at all stations. The small size and pale grey color will distinguish this species.

Two other species of *Platymetopius* were taken by me which I have not been able to determine to my satisfaction.

302. **Deltocephalus inflatus** Osborn & Ball.

Crescent City, Sevenoaks and Estero. The specimens taken seem to be somewhat intermediate between this species and *reflexus* having the claval nervures united in some examples and in others the dark brown on the base of the front is abruptly distinguished from the pale apex.

303. **Deltocephalus** sp.

Very abundant and almost universally distributed in Florida. It finds its home among the thin grasses growing on the dry sands of the pine barrens which cover the whole length and breadth of the state.

304. **Deltocephalus** sp.

Estero; two examples of a species that seems to be very near *imputans* but I believe is distinct.

305. **Deltocephalus** sp.

Estero; four examples. This species is near *imputans* but probably is distinct. It may be the female of the preceding.

306. **Deltocephalus obtectus** Osborn & Ball.

Taken occasionally at nearly all places where I worked in Florida and Mrs. Slosson has taken it at Belleair and Biscayne Bay. Heretofore I have taken it about Buffalo and at Columbus, Ohio. It is one of our prettiest and most clearly marked species.

307. **Deltocephalus Weedi** VanDuzee.

Crescent City, Clearwater, Sevenoaks and Estero. Mrs. Slosson has taken this species at Biscayne Bay and I found numbers at Effingham, Ks., in July 1900.

308. **Deltocephalus sonorus** Ball.

Estero and St. Petersburg; two examples. Mrs. Slosson has found it at Biscayne Bay and Belleair. It is very close to *nigrifrons*.

309. **Deltocephalus** sp.

At Sanford and Sevenoaks I took an undescribed species allied to *sonorus* but reasonably distinct. It was not common.

310. **Deltocephalus littoralis** Ball.

St. Petersburg. Swept from marsh grasses along the shore of Tampa Bay.

311. **Deltocephalus** sp.

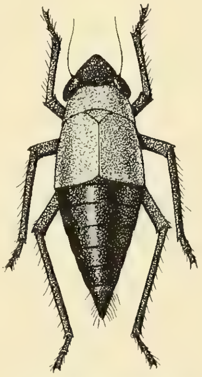
Sevenoaks; one example of a species allied to *parvulus*.

312. **Deltocephalus capreatus** Ball.

Sevenoaks; one example. This individual is imperfectly colored and probably is immature but I believe it belongs here. The apical half of the vertex is black with white arcs.

313. **Lonatura bicolor** n. sp.

Apparently most nearly related to *catalina*, a species still unknown to me in nature. Deep black with the pronotum, scutellum and elytra pale straw yellow. Length 3 mm.


LONATURA BICOLOR

Head conical well produced; about as in *catalina* as figured by Osborn and Ball; Closely punctured; marked on the base of the vertex by two oblique scars placed near the eyes. Front very broad and short, convex; closely and evenly punctured; sides and apex rectilinear. Clypeus broadest at base, tapering moderately to the apex. Scutellum small as in brachypterous *catalina*. Elytra reaching almost to the base of the second tergal segment. Last ventral segment of the female rather long, the hind margin broadly roundingly produced across two thirds of its width. Valve of male concealed; plates small, triangular, narrow at apex, scarcely attaining the tip of the rounded pygofers.

Color deep black; apex of the head with three minute pale points, one at the tip inferiorly and two on the vertex anteriorly; ocelli pale. Narrow hind margin of the vertex, pronotum except the anterior angles behind the eyes, scutellum and elytra pale straw yellow. Front with very obscure paler arcs and there are some indefinite pale marks on the cheeks, loræ, pleural pieces and base of the venter; tibiæ and tarsi more or less brown marked with paler at the base of the spines.

Described from one male and two female examples taken at Ft. Myers and Estero.

At Sevenoaks I took what appears to be a color variety of this species. It is entirely pale straw yellow with the anterior margin of the vertex unevenly black; the pale color on the base being extended forward in the middle to the two pale points and almost uniting before with a pale spot close to the apex. The anterior angles of the pronotum behind the eyes are black as they are in the black form above described, and the genital segment of the male and the disk of the sixth ventral segment are black. The front, pleural pieces and legs are mostly brown, the former showing pale arcs and a median line, and the latter are varied with pale on the tibiæ.

Tribe Athysanini.

314. **Athysanus exitiosus** Uhler.

Common everywhere in Florida. Those taken vary much in size and coloring, the palest being from Estero.

315. **Athysanus bicolor** VanDuzee.

Crescent City, St. Petersburg and Tampa; not common.

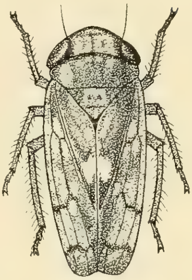
316. **Athysanus obtutus** VanDuzee.

Crescent City; moderately abundant about waste places.

317. **Eutettix Slossoni** VanDuzee.

Sanford, St. Petersburg, Sevenoaks and Ft. Myers. Three males and three females were taken which agree very closely with my description of the type, a pale female. The females in the present lot want the black points on the face; the band on the base of the pronotum is black or dark piceous, and in one example the elytra are deepened to a rich brown, fading to hyaline at the costa. The males are piceous-black above with the vertex, pronotum anteriorly and scutellum clear yellow; costa broadly whitish-hyaline tinged with brown basally and with the apex abruptly deep fuscous. In two the black band at the base of the front is entire.

318. **Eutettix Bartschi** n. sp.



EUTETTIX BARTSCHI

Form and size of *Slossoni.* Fulvous or brown varied with paler; base of the front black in the male, rufocastaneous in the female. Length: male 4; female 5 mm.

Male: Vertex light yellowish; transverse impressed line between the ocelli and a short longitudinal line either side fulvous. Face pale yellowish, a transverse band on the base of the front, about five arcs more or less united in a cloud below this and a dot below the antennæ black. Clypeus with a double longitudinal brown line. Pronotum paler anteriorly with a few fulvous marks and points. Scutellum pale with the basal angles, two dots between them and the transverse line fulvous-brown. Elytra varied with whitish; paler toward the costa and darker along the commissure; saddle small and distinct, connected by a black vitta to two white points before and two behind, the latter at the tip of the clavus; the anterior pair sometimes obsolete. Legs pale; abdomen black, the margins and edges of the segments yellow. Female bright fulvous marked as in the male. Abdomen and beneath pale yellow; the face pale with a rufous band at base; oviduct castaneous.

Described from numerous specimens beaten from scrub oaks at Sevenoaks and Estero, at the latter place abundant.

This is a typical *Eutettix* nearest *Slossoni* and *marmorata.* I cannot as yet agree with my friend Dr. Ball in placing all the species of *Eutettix* of the *lurida* group as subspecies of one typical form; and, if this were done I do not see how we can use the name *subænea* for this group as that is an abberrant form from the Pacific coast and not at all typical of the group it would have to represent. *Lurida* is the type of the genus and it seems to me is the name that should have been used for the group notwithstanding *subænea* was published first. The three species I took in Florida show very little variation and are as distinct in both sexes as are the species in any of our large plastic genera. I take pleasure in naming this species after my good friend Walter F. Bartsch of Estero who has taken much interest in my work and has sent me some interesting Hemiptera since my return from Florida.

319. **Eutettix nitens** n. sp.

Allied to *picta.* Clear yellow; elytra black in the male, fusco-hyaline in the female. Length: male 5½; female 6 mm.

Head and scutellum clear light yellow. Eyes black. Elytra piceous-black in the male; fusco-hyaline in the female; saddle light yellow, rather small; costa broadly hyaline as far as the apical areoles. Prosternum with a black spot beneath the anterior coxæ; vertex marked with a black vitta on either side; tergum with about four transverse black vittæ.

Described from one pair taken at Sevenoaks and a female from Estero. This is a typical *Eutettix* and quite distinct by its uniformly yellow head pronotum and scutellum. The female from Estero is pale, evidently not having attained its full coloring. In two examples the humeral angles are marked with a black vitta and in both females the hind margin of the last ventral segment is much more produced at the middle than in our other allied species. These three specimens were beaten from oak bushes.

320. **Eutettix** sp.

At Sevenoaks I took one example of a species that is still undescribed. It seems to be most nearly related to *cincta* O. & B.

321. **Phlepsius excultus** Uhler.

Crescent City, Sanford, Sevenoaks and Ft. Myers. Taken occasionally while beating bushes over an umbrella.

322. **Phlepsius decorus** Osborn & Ball.

Tampa; one example. I have taken this species at Hamburg and Gowanda, N. Y., Mr. Metcalfe at Brockville, Ont., and Mr. Coleman has collected it in Santa Clara Co., California. This extends its range over a great part of the United States and Canada.

323. **Phlepsius mimus** Baker.

At Crescent City I took one example that agrees very closely with Baker's description and I think there can be no doubt but it is the female of his species, which was described from a male collected by Dr. Uhler at Odenton, Md. In this female the three pairs of brown spots along the commissure are quite conspicuous and the margin of the scutellum is alternated with black and white. The form of the last ventral segment is distinctive, the hind edge being quite deeply sinuated either side of a deep triangular median notch the margin of which is black and polished. I would arrange this species in the *irroratus* group near *turpiculus.*

324. **Phlepsius truncatus** VanDuzee.

One pair taken at Crescent City and Sevenoaks. These are a little smaller than were the types from North Carolina but this variation in size is no more than we find in *irroratus.*

325. **Phlepsius** sp.

Three examples of a still undescribed species of *Phlepsius* were taken at Ft. Myers and Sevenoaks. This is a pale species with the head thin and produced.

326. **Phlepsius pulchripennis** Baker.

Taken at Crescent City, Sanford, Sevenoaks, St. Petersburg and Ft. Myers and Mrs. Slosson has sent me specimens taken at Belleair. This is a small narrow species recalling certain dark species of *Scaphoideus.* The elytra are strongly marked with fuscous areas along their axies and the scutellum may be almost fulvous. Prof. Osborn thinks this species may prove identical with *Allygus costomaculatus* VanD. from Texas.

327. **Phlepsius fuscipennis** VanDuzee.

Common everywhere is suitable locations. It lives on a low fine Juncus growing in abundance along the shores of most of the lakes I visited in Florida. I took it in greatest numbers about Lake Stella at Crescent City and Lake Monroe at Sanford.

328. **Acinopterus acuminatus** VanDuzee.

Taken occasionally at Tampa and Sanford.

329. **Scaphoideus obtusus** Osborn?

Crescent City, Sanford, Sevenoaks and Ft. Myers. This is the only representative I found of the typical *immistus.* group. It is with some doubt that I place it with Osborn's species as the vertex is not shorter and less acute than in *immistus.* It bears a strong resemblance to var. *minor* of that species but the male plates are long triangular, at least two thirds the length of the pygofers. In this respect it approaches *luteolus* but it is very distinct otherwise. It may readily be recognized by the two transverse white bands on the pronotum connected by a slender median line. The white commissural vitta is conspicuous in most specimens and is twice interrupted by the oblique and heavily infuscated claval nervures. There is a large brown cloud on the anteapical areoles more or less extended basally, and a distinct apical black or fuscous cloud beyond which the extreme edge is white. I have taken one example of undoubted *obtusus* Osb. at Lancaster, N. Y., which Prof. Osborn has kindly compared with his types. He is inclined to place these Florida examples as a variety of *immistus*.

330. **Scaphoideus opalinus** Osborn.

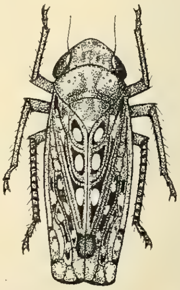
Sevenoaks; two examples. This species was described in Prof. Osborn's paper on the Jassidæ of New York State. I have taken it at Riverton, N. J., and Gowanda, N. Y. The whitish vertex, middle of the pronotum and scutellum, give it the appearance of having a white dorsal vitta anteriorly.

331. **Scaphoideus consors** Uhler.

Crescent City; three examples. This is a pretty little species sufficiently distinct from the more western *scalaris*. The vertex is longer, more pointed and more clearly marked than in *scalaris* and in the present specimens the facial sutures are conspicuously fuscous.

332. **Scaphoideus albonotatus** n. sp.

Closely allied to *consors* and *scalaris* but larger and stouter than either and marked with three pairs of nearly round white spots along the commissure of the closed elytra. Length 5½ mm.



SCAPHOIDEUS ALBONOTATUS

Vertex about as long as in *scalaris* with the apex more obtuse in the female, subacute in the male; anterior edge more obtusely rounded than in *consors* but sharper than in *scalaris*. Front and clypeus proportionately broader than in *scalaris*, much broader than in *consors*. Outer anteapical areole of the corium of equal width throughout, not distinctly narrowed at apex as in the allied species; inner areole with two supernumerary transverse veinlets behind the regular veinlet which forms its base. Claval nervures strongly approaching one another and sometimes connected, the outer connected to the claval suture by a transverse veinlet. Last ventral segment of the female short triangular, the apical margin oblique and nearly rectilinear either side, not regularly rounded at the outer angles. Valve of the male short, broadly rounded; plates long and bluntly triangular, their flaccid tips nearly attaining the apex of the pygofers, armed with stout marginal bristles.

Color fulvous brown, a little lighter on the vertex, anterior margin of the pronotum, scutellum and venter; step-shaped pale marks on the base of the vertex sometimes rather obscure but with the brown shade bounding it anteriorly quite distinguishable, the median brown line distinct; anterior margin with a fuscous vitta usually broken into four spots. Front becoming fuscous at base with a few abbreviated arcs either side and bounded at base by a black line and a blackish cloud covers the base of the cheeks; sutures scarcely darker. Anterior submargin of the pronotum with a few darker marks among which is a blackish dot behind each eye; basal angles of the scutellum obscurely fulvous. Elytral nervures fuscous, the areoles with from one to three whitish spots in each, more or less distinctly outlined in brown, those in the inner discal areole connected by a brown cloud; commissural nervure pale, the surface either side ornamented with three nearly round conspicuous white spots outlined in brown and separated by the curved brown claval nervures, the basal enclosed in a larger oval blackish spot; the outer claval areole with a long blackish streak intercepted by the posterior of these white commissural spots.

Described from one male and three female examples taken at Estero. The markings found in this species are substantially those of *consors*, *scalaris* and *mexicanus* but the insect is larger, the last ventral segment of the female is more distinctly triangular, the venation of the elytra is different and the six commissural spots are conspicuous and characteristic although a similar maculation is found in *Eutettix cincta* and in a few other species not congeneric with this.

333. **Scaphoideus jucundus** Uhler.

I obtained one female of this species at Estero.

334. **Scaphoideus sanctus** Say.

Of this conspicuous species I took a female at Clearwater and a male at Ft. Myers.

335. **Scaphoideus fasciatus** Osborn.

Crescent City and St. Petersburg; three females. I think there can be no question but this species is distinct from *sanctus* although I would not rely upon the form of the vertex which is variable in each species as they are represented in my collection. *Fasciatus* is distinctly smaller and paler and the last ventral segment of the female is shorter and less produced at the middle.

336. **Thamnotettix subcuprea** Provancher.

Sanford, Sevenoaks and Ft. Myers. This species seems to be widely distributed. It occurs in western New York, Mr

Palmer has taken it about Lake Temagami in Ontario, I have taken it in New Jersey and have seen others from Medicine Hat in Assiniboia.

337. **Thamnotettix perpunctata** VanDuzee.

Crescent City, Sanford and St. Petersburg. The few specimens taken agree in every respect with those I have seen from Mississippi and other southern states.

338. **Thamnotettix comata** Ball.

Taken occasionally at Crescent City, Sanford, Sevenoaks and St. Petersburg. These are of the light colored form taken by me in Jamaica.

339. **Chlorotettix viridia** VanDuzee.

I found this species at all places where I worked. It was especially abundant at St. Petersburg and Sevenoaks.

340. **Chlorotettix rugicollis** Ball.

This species was taken at most places where I worked but it was more local being confined mostly to the damp well shaded spots where there was a rich growth of vegetation. The immature are sometimes of a clear sanguineous but when fully developed they are deep green with the crimson band on the anterior margin of the head well marked.

341. **Chlorotettix necopina** VanDuzee.

Not uncommon at Crescent City, Sanford, Sevenoaks and Clearwater.

342. **Chlorotettix galbanata** VanDuzee.

Ft. Myers; one pair only.

343. **Chlorotettix minima** Baker.

I took one female at Estero. This tropical species was described from Brazilian material but I have taken it in Jamaica. The southern end of Florida may probably be its most northerly range. Like the preceding and following species it has the head produced and subangulate before.

344. **Chlorotettix tunicata** Ball.

Taken at Sanford, St. Petersburg, Clearwater and Estero.

Tribe Jassini.

345. **Jassus olitorius** Say.

Common everywhere in Florida. These southern specimens are of a clear rufous brown, in the females darker with a light vitta indicated at the base of the apical areoles. They have a very different aspect from our dark colored northern specimens but I can find no structural character on which to separate them.

346. **Paracœlidia tuberculata** Baker.

At Sevenoaks I took one large female over 6 mm. in length. This species bears a strong resemblance to *Neocœlidia lineata* but the colors are paler, the vertex is a little more pointed and the clypeus is strongly tuberculate; which latter character will at once distinguish it from any allied form known to me.

Subfamily Cicadulinæ.

347. **Cicadula 6=notata** Fallen.

Sanford and Ft. Myers; two examples.

348. **Balclutha impicta** VanDuzee.

Crescent City; two examples.

349. **Eugnathodus abdominalis** VanDuzee.

Sanford, Clearwater and Ft. Myers; occasional.

Subfamily Typhlocybinæ.

350. **Empoasca mali** LaBaron.

Crescent City, Sanford, Ft. Myers, Estero. As taken in Florida this species is a little larger than the next.

351. **Empoasca flavescens** Fabricius.

Crescent City and Estero. Prof. Gillette separates this species from the preceding by its having but three pale spots on the anterior margin of the pronotum.

352. **Eupteryx flavoscuta** Gillette.

Sanford and Sevenoaks; two examples. These are of the form having the upper surface deep smoky black with the vertex before and the costal margin broadly yellowish.

353. **Typhlocyba comes** Say.

Crescent City, Sevenoaks and Estero. The typical form of this species was taken occasionally on grape vines at these localities.

354. **Typhlocyba rubricata** n. sp.

Aspect of *Dicraneura* but with typical *Typhlocyba* venation and pertaining to that section of the genus named *Zyginia* by Fieber. Color pale yellowish becoming fulvous on the abdomen and more obscure on the vertex and scutellum; pronotum and elytra dark dull sanguineous, the former becoming paler anteriorly and brighter red along either side, the latter with the broad costal margin almost to the base yellow and the apex infuscated. Wings smoky hyaline with fuscous nervures. Tergum blackish becoming sanguineous toward the margins.

Vertex long, little shorter than the pronotum, strongly but roundedly angled at apex, base deeply concavely arcuated. Last ventral segment of the female narrow, triangularly produced. Length 2½ mm.

Described from 15 females taken at Crescent City. This species is very distinct from any described form known to me. It is allied in color to *coccinea* Fitch but it does not pertain to that section of the genus named *Empoa* by Dr. Fitch.

NEW GENERA

Idioderma,	p. 207	**Neoslossonia,**	p. 218

NEW SPECIES

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New specific name.

Cixius dorsivittatus n. n. *for* Cixius dorsalis VanD. p. 188

Recapitulation.

Number of genera listed in this paper, 203.
Number of species and varieties listed in this paper, 354.
Number of new genera described in this paper, 2.
Number of new species described in this paper, 29.

New species of Tingitidæ
and description of a new Leptoglossus (Hemiptera-Heteroptera.)

By OTTO HEIDEMANN

For some years I have been collecting material for the preparation of a revision of the North American Tingitidæ. Lately I was urged by my correspondents to bring out in advance some of the new species and following this advice I have already published a few papers on the subject. This paper will be another contribution to our knowledge of this interesting family. It includes besides a new *Leptoglossus* and another new Tingid, four new species of *Atheas*, a genus which is widely distributed but has not previously been recorded as occurring in the United States. The genus *Atheas* was founded by Dr. G. C. Champion *) on specimens collected in Mexico, Guatemala and Panama. He described three species, *A. flavipes*, *A. fuscipes* and *A. nigricornis*. These are quite similar to our forms but there are decided although slight characters to be found by which the North American new species can easily be recognized.

Our four new species of *Atheas* may be separated as follows:
Third antennal joint with a short black band at base.

Subcostal area of elytra narrower than the costal area,
A. insignis.

Subcostal area of elytra wider than the costal area,
A. austroriparius.

Subcostal and costal areas of elytra of nearly equal width,
A. exiguus.

Third antennal joint with a long black band at base covering one third of the joint,
A. mimeticus.

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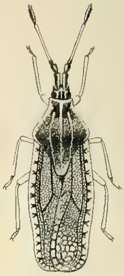
*) Biologia Centrali Americana (1897–1900); Heteroptera, vol. II, p. 44.

Atheas insignis n. sp.



ATHEAS INSIGNIS

Body narrow and depressed, elongate-oval; color black, in fresh specimens covered with a pruinose substance which is less conspicuous on the head and thorax. Head rather short with two longitudinal black stripes and a small obtuse tubercle in front; the antenniferous tubercles prominent, broad at base, acute at tip; the buccal laminæ moderately broad and a little extended to beyond the margin of the head, rounded in front, yellowish-white, with two rows of very small cells. The eyes globose and black. Antennæ comparatively short; the basal two joints stout and black, the first slightly constricted before the middle, the second considerably shorter, the third slender, about twice as long as the terminal, slightly thickened towards base, yellowish-white except at base where there is a short black band; last joint less stout than the first two, fusiform and blackish, beset with whitish fine hairs interspersed with longer ones. Pronotum without a hood, tricarinate, feebly convex, finely punctured and a little depressed anteriorly; the carinæ yellowish-white, slightly raised but showing minute cells with some of the cross nervures blackish, the median carina runs from the anterior margin of the pronotum to the triangular posterior portion, the latter has at apex some pale yellowish small areoles and the tip is obtusely rounded; the outer carinæ abbreviated, bending inwardly before and behind the middle; membranous lateral margins of the pronotum very narrow, slightly sinuated near the middle, extending laterally to a little past the eyes, posteriorly rounded, meeting the basal part of the elytra, uniseriate, with a few minute cells at inner side, hyaline; yellowish-white, the cross nervures somewhat blackish; anterior margin a little rounded, narrowly pale yellowish.

Elytra oblong-oval and narrow, widest at middle, much longer than the abdomen, the lateral margins [in the male] distinctly sinuate towards apex and broadly rounded at tip; discoidal area rather narrow, widest at the middle, obtusely pointed at apex, about half as long as the elytra, with three or four rows of small areoles at widest part, pale yellowish except the outer and inner nervures which are black; subcostal area very narrow throughout, with two rows of minute areoles; costal area hyaline, yellowish-white, broader than the subcostal, with one row of rather long and large areoles, a few additional smaller ones near the edge of the lateral margins, the cross-nervures blackish; the sutural area has irregular rather large areoles with the nervures black or brownish except at inner part which is yellowish and closely reticulated. In the female the elytra are somewhat broader and more evenly rounded at the sides than in the male. Rostrum very short, not reaching farther than to the anterior coxæ; rostral laminæ feebly raised, converging at the middle of the mesosternum; metasternum longer than broad, closed in front. Genital segment of female broadly rounded at apex, that of the male convexly rounded with a small shining hump at the middle. Wings whitish, iridescent, nearly as long as the elytra. Legs rather short, yellowish, last tarsal joint and claws blackish.

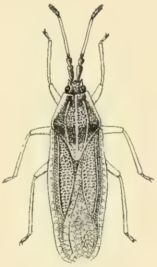
Length 2.4 m.m.; width across the widest part of the elytra 0.8 m.m.

Described from five specimens, males and females. Washington, D. C. and Bladensburg, Md., July 21, 1890. (O. Heidemann).

Type from Bladensburg, Md., July 21, 1890, male and female—No. 12186. U. S. National Museum.

This very pretty Tingitid resembles *Atheas nigricornis* Champion but differs in having a narrower form, somewhat shorter antennæ, the lateral margins sinuated towards apex and the nervures marked more with blackish. At the present time this species is not known from any other localities, and the nymphs and its foodplant are also unknown.

Atheas exiguus n. sp.



ATHEAS EXIGUUS

Body very narrow, depressed. Head a little broader than long, with two median black stripes and a small tubercle in front; antenniferous tubercles short, pointed at tip. Antennæ slender, about as long as from the apex of the head to the tip of the triangular posterior portion of the pronotum, the basal two joints and the fourth thickened and black, the latter hardly twice as long as the second which is shorter than the first; third joint long and thin, pale yellowish with a short black band at base. Pronotum feebly convex, closely punctured, laterally narrowing towards the front, anterior margin slightly broader than the head, with a yellowish rim, lateral membranous margins almost straight, hyaline, yellowish-white, very narrow posteriorly, widening more anteriorly, uniseriate, with a few smaller cells within; the three pronotal carinæ feebly raised, yellowish, the outer ones slightly curved, shorter than the median carina; the apical part of the triangular posterior portion yellowish with small round cells, tip obtusely rounded.

Elytra elongate, widest before the middle, barely sinuated towards apex and rounded at tip, the lateral margins hyaline, yellowish-white; discoidal area narrow, widest at the middle, rather long, extending posteriorly over the middle of the elytra, obtusely pointed at apex, with three or four rows of very small areoles at widest part, yellowish; the inner and outer longitudinal nervures brownish or fuscous; subcostal area very narrow throughout with two rows of minute areoles; costal area hardly broader than subcostal with one row of larger areoles and a few smaller cells near to the edge. The sutural area has irregular medium sized areoles and a large space at inner part closely reticulated and yellowish, the nervures more or less brownish or fuscous. Rostral laminæ parallel at the mesosternum. Legs somewhat tawny, last tarsal joint and claws blackish. The female is a little larger than the male and a trifle broader.

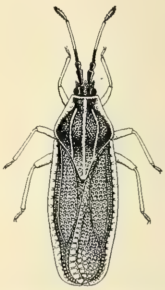
Length 2. m.m. to 2.2 m.m.; width across the widest part of the elytra 0.6 m.m.

Described from eight specimens, males and females. Sevenoaks, Fla., May 1st, 1908 (E. P. VanDuzee); Florida (Uhler).

Type (from Sevenoaks, Fla., May 1, 1908, male and female)—No. 12187. U. S. National Museum.

This neat Tingitid may be distinguished from *Atheas insignis* by the narrowness of body and somewhat smaller size; the cross-nervures of costal area are not blackish, as in the first species, and the areoles of the sutural area towards the apex are considerably smaller and of a more uniform size. This new species was found in the south-western part of Florida by my friend Mr. E. P. VanDuzee who kindly sent me his specimens for description with a manuscript name which I have adopted. Another specimen labeled Florida is from Prof. Uhler's collection.

Atheas mimeticus n. sp.


ATHEAS MIMETICUS

Body elongate - oval, depressed and black. Head slightly broader than long, the very acute antenniferous tubercles diverging a little. Antennæ slender, the first two joints and the fourth thickened and black; third thin, nearly twice as long as the terminal, pale-yellowish with the basal one third blackish. Pronotum slightly convex, narrowing towards the front, very closely punctured, black; the membranous lateral margins straight, narrowly rounding at the shoulder, widening anteriorly; yellowish-white, uniseriate; the three carinæ feebly raised, yellowish; triangular portion of the pronotum pale yellowish towards apex, with a few small areoles, tip obtusely rounded.

Elytra elongate, widest at the middle, lateral margins almost evenly rounding towards apex, hyaline, yellowish-white; discoidal area long, extending to beyond the middle of the elytra, with four to five rows of small areoles, yellowish, outer and inner longitudinal nervure fuscous or brownish; subcostal area narrow throughout with two rows of minute areoles; costal area nearly as broad as the subcostal with two rows of areoles, those at the edge of the margin much smaller than the others, nervures blackish only at the inner side of the costal area. Legs dull yellowish with the tarsal joints and claws black. Male and female uniform in size. This species has a brachypterous form which is shorter and stouter with the elytra less elongated, wider behind the middle and hardly surpassing the abdomen.

Length 2.4 m.m.; width across the widest part of the elytra 0.8 m.m.

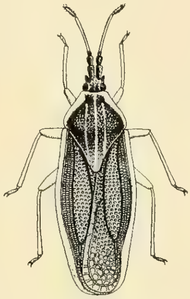
Described from seven specimens, males and females and one brachypterous female. Milwaukee, Wis. (W. H. Ashmead); Minnesota (P. R. Uhler); Baldwin, Ks., January 2, 1898 (Bridwell); Effingham, Ks., July, 1900 (E. P. VanDuzee); Onaga, Ks., July 5, 1898 (Crevecour); Kansas, July 2, 1900 (Heidemann).

Type (from Onaga, Ks., July 5, 1898; Milwaukee, Wis., male and female).—No. 12188. U. S. National Museum.

This species has a great similarity to *A. exiguus* but is distinct from it by the more robust form and in having the third antennal joint for one third of its length at base black. It seems to be the western representative of the genus and has been found as far north as the state of Minnesota.

Atheas austroriparius n. sp.

Body elongate-oval, depressed, black. Lateral margins of the pronotum and elytra hyaline, yellowish-white. Head hardly broader than long, blackish; antenniferous tubercles prominent, distinctly diverging at apex. Antennæ slender, as long as from the apex of the head to the tip of the triangular portion of the pronotum. First two joints equally stout and black, the terminal a little less, blackish, third thin, yellowish, with a short black band at base. Pronotum very feebly convex, narrowing towards the front, closely and deeply punctured, lateral margins straight, narrow posteriorly, thence widening anteriorly; pronotal carinæ feeble, somewhat indistinct at the middle, the abbreviated outer ones parallel to the median carina; triangular portion of the pronotum rather short, tip obtusely rounded, yellowish.



ATHEAS AUSTRORIPARIUS

Elytra somewhat less elongate, widest at the middle and gradually rounding towards apex; discoidal area very long, extending nearly to the tip of the abdomen, with four rows of small areoles at widest part, the outer and inner longitudinal nervures black; subcostal area wider than the costal with three rows of small areoles, the nervures light brown; costal area with one row of medium sized areoles and some smaller cells near the margin; sutural area with larger areoles near apex and much smaller and irregular ones at the inner side, nervures fuscous or brownish. Rostral laminæ at mesosternum parallel, yellowish-white. Legs yellowish-brown, tarsal joints infuscated. This species has also a brachypterous form like the preceding. It differs from that in having a somewhat larger and broader body and the elytra not longer than the abdomen.

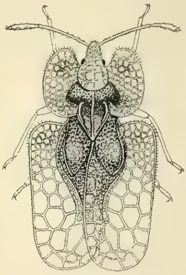
Length 2.6 m. m.; width 1 m.m.

Described from three specimens, females, two of them brachypterous. Columbus, Tex., June 16 (Coll. C. V. Riley); Duval Co.. Fla. (W. H. Ashmead).

Type (from Columbus, Tex., June 16; Duval Co., Fla.)—No. 12189. U. S. National Museum.

This species is somewhat larger and stouter in form and can be distinguished at once from the preceding by the broad subcostal area which is wider than the costal. Up to the present time it has been found only in the southern states.

Corythuca floridana n. sp.



CORYTHUCA FLORIDANA

Body rather short and broad, dark brown. The membranous lateral margins of the pronotum and elytra hyaline, iridescent, with pale yellowish nervures; fully colored specimens have some of the nervures embrowned at apex, near the base of the elytra and near the front of the membranous lateral margins and there are a few brown specks at the hood. Head small, dark brown, lighter on the face, entirely covered by the pronotal hood excepting the round black eyes; the narrow bucculæ, the long stout beak and the feebly raised rostral laminæ yellowish. Pronotum transverse, convex, narrower anteriorly, sparcely punctured, shining, brownish, darker at front; the humeri very prominent; lateral margins rounding off anteriorly. Hood moderately inflated, constricted at about the middle, posterior part globose; (viewed from the side) gradually tapering toward the tip and moderately raised above the adjoining median carina. The membranous lateral margins ear-shaped, comparatively large, obtusely rounded in front, posteriorly reflexed and broadly rounded; surface sunken before and behind the middle with medium sized areoles. The three foliaceous carinæ yellowish-white, the outer abbreviated, much lower than the median which is highest at the middle, sloping abruptly towards the triangular portion of the pronotum; median carina with a few very large cells.

Elytra nearly subquadrate, lateral margins straight, broadly rounded at base and apex; edged with short white spines which are tipped with black, Similar spines are found on the pronotal margins and a few scattering ones are on the nervures of the hood; discoidal area reticulated, yellowish-white, strongly elevated behind, forming a bulla with some quite large areoles at the crest and a brownish spot posteriorly; subcostal area uniseriate, biseriate at widest part with smaller and larger areoles. The costal area has very large irregular areoles with extremely large ones at the inner side and near the apex of the elytra, those at the base considerably smaller while those on the basal part of the sutural area are round and of medium size. Antennæ moderately long, yellowish, with fine hairs and longer bristles; last joint not infuscated. Legs yellowish brown, tip of the tarsi darker. Last abdominal segment usually light brownish.

Length 2.4 m.m.; width 1.2 m.m.

Described from ten specimens, males and one female. Bartow, Fla., June 16, 1894 (Hubbard and Schwarz); Biscayne

Bay, Fla., (A. T. Slosson); Crescent City, Fla., April 20, 1908 (E. P. VanDuzee).

Type (from Bartow, Fla. Biscayne Bay, Fla.); male and female.—No. 12190. U. S. National Museum.

This small new species is nearest allied to *Corythuca pergandei* Heidemann. It differs however in being more delicate and smaller, in having the areoles of the elytra larger and the color markings not prominent. It has also some resemblance to *Corythuca gossypii* Fabr., from which it can be distinguished by the lower median carina not reaching the crest of the hood. This species has been found on Cephalanthus.

Leptoglossus Ashmeadi n. sp. (Coreidæ.)

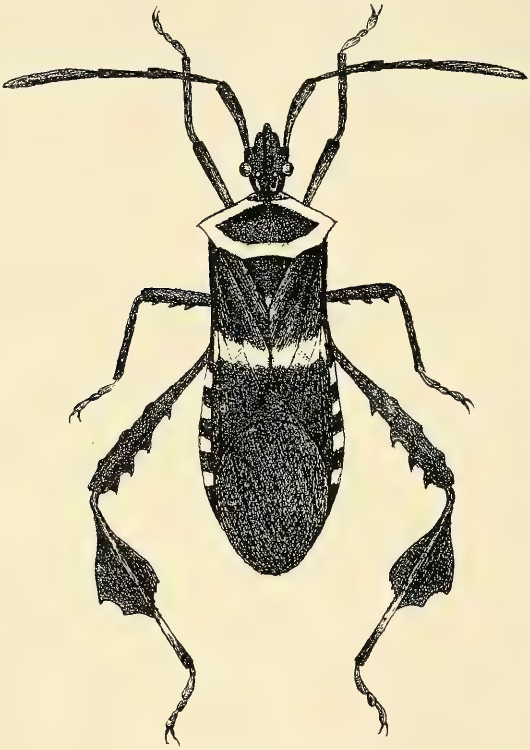
Body long oval, covered with fine pale hairs; color bluish-black with bright orange markings. Head as long as the first antennal joint, above and below bluish-black with two narrow orange stripes above, extending towards the base. Rostrum hardly reaching the hind coxæ, entirely black, fourth joint twice as long as the third. Antennæ pilose; basal joint stout, slightly curved outwardly, somewhat narrowed at base; second and fourth subequal in length; third shortest. Pronotum confluently punctured with all its sides broadly margined with orange, leaving the disk velvety bluish-black as also the callosities and a narrow streak which connects them with the center; lateral margins nearly straight, the posterior angles hardly reflexed, bent backwards, a little pointed at the end; anterior margin narrower than the head, posterior margin slightly depressed with two small pale tubercles on the orange border. Scutellum bluish-black, with the tip orange, feebly convex at base, finely wrinkled, with two transverse shallow impressions at the middle.

Hemelytra bluish-black, finely punctured, the posterior portion more strongly so, across the middle with a transverse orange dentate band. Membrane dull brownish-black. Dorsum of abdomen partly bluish-black; connexivum at base of incisures banded with orange; ventral part and breast bright orange except the edges of the abdominal segments which have an undulated black line; middle of the sixth segment and the genitalia entirely black; on the breast are two large black spots, there are broad black streaks back of each of the coxæ and a few scattered smaller black spots at the sides. Prosternum covered with large punctures, the last abdominal segments finely striated at apex. Legs long, bluish-black; hind femora not bent, much thickened toward the apex with two rows of hook-like tubercles on the upper side and beneath two other rows of four to five strongly curved spines; middle femora with about three spines, the front femora with one or two; hind tibiæ near the basal part moderately foliaceous-expanded, bluish-black, with no pale dots or speckles; the outer margin broadest at the middle, slightly rounding from near the base of the tibiæ, thence twice sinuated towards the apex, forming two sharp points; the inner margin less broad, abruptly declining apically, armed with a few small teeth; the simple portion of the tibiæ narrowly annulated with orange behind the dilation.

Length 14 m.m.; greatest width 5 m.m.

Described from one specimen, a female. St. Nicholas, Fla., (Collection W. H. Ashmead).

Type (from St. Nicholas, Fla.)—No. 12192. U. S. National Museum.



LEPTOGLOSSUS ASHMEADI

This species comes from the collection of the late Dr. W. H. Ashmead where it was labeled as unique. He had found it while residing in Florida. Lately I had an opportunity to see another specimen, also a female, which my friend E. P. Van Duzee captured last summer on his trip in Florida. This new species will be recognized at once from other *Leptoglossus* species by its vivid orange color pattern. It is most nearly related to *Leptoglossus oppositus* Say in the shape of the foliaceous part of the hind tibiæ. I take pleasure in dedicating the species to the late Dr. W. H. Ashmead.

A Partial List of the Shells
found in Erie and Niagara Counties, and the Niagara Frontier

By Elizabeth J. Letson, Sc. D.

Director of the Museum, Buffalo Society of Natural Sciences.

The following list is made at the request of numerous collectors in this city who desire to know what to look for, and is in no way offered as a complete list of the land and fresh water shells of Buffalo and vicinity. The data presented are from the records of the Conchological Section of the Buffalo Society of Natural Sciences. *E. J. L.*

List of Species.

Pleurocera subulare Lea. Niagara riv.

Goniobasis depygis Say. Cazenovia ck., E. Aurora, Niagara riv., Lancaster.

Goniobasis livescens Mke. Griffin's Mills, Niagara riv., Eighteen Mile ck.

Goniobasis niagarensis Lea. Niagara riv.

Goniobasis brevispira Anth. Niagara riv. at Falls.

Bythinia tentaculata Linn. Erie Canal.

Bythinella obtusa Lea. Chippawa ck. Ont.

Amnicola pallida Hald. Hamburgh.

Amnicola limosa Say. Lime Lake, Chippawa ck., Frenchman's ck., Erie Canal, Niagara riv., Park Lake, Buffalo.

Amnicola cincinnatiensis Anth. Park Lake, Buffalo, Chippawa ck.

Amnicola lustrica Pils. Chippawa ck.

Amnicola letsoni Walk. Goat Isl. Niagara riv.

Amnicola walkeri Pils. Frenchman's ck., Lime Lake.

Somatogyrus isogonus Say. Niagara riv.

Pomatiopsis lapidaria Say. Niagara Falls.

Valvata tricarinata Say. Niagara riv., Erie Canal, Frenchman's ck.

Valvata sincera Say. Lime Lake.

Campeloma decisum Say. Niagara riv., Lake Erie.

Campeloma subsolidum Anth. Niagara riv.

Vitrina limpida Gld. Lancaster, Lime Lake.

Omphalina fuliginosa Griff. Ebenezer, Foster's Flats, St. David's glen.

Omphalina inornata Say. Hamburg, Buffalo, (in gardens), Springville.

Vitrea hammonis Ström. Chippawa.

Vitrea cellaria Müll. Buffalo, (Bennett st.)

Vitrea indentata Say. Rose Hill (Graham Farm), Lewiston, Lime Lake, Foster's Flats.

Zonitoides nitidus Müll. Rose Hill (Graham Farm), Williamsville, Chippawa.

Zonitoides arboreus Say. Concord, Rose Hill, South Buffalo between Ry. tracks, Government Woods, Fort Erie, Ont., Goat Isl., Springville, Machias, Chippawa.

Zonitoides minusculus Binn. South Bfo. betw. Ry. tracks, Goat Isl., Buffalo (Bennett st.)

Zonitoides exiguus Stimp. Chippawa.

Zonitoides milium Morse. Chippawa.

Euconulus chersinus Say. Rose Hill (Graham Farm), Lime Lake.

Euconulus chersinus var. **polygratus** Pils. Rose Hill (Graham Farm).

Gastrodonta intertexta Binn. Ebenezer, Fort Erie, Foster's Flats, Goat Isl., Springville.

Gastrodonta ligera Say. Ebenezer.

Pyramidula alternata Say. Universal at all stations.

Pyramidula striatella Anth. South Buffalo betw. Ry. tracks

Pyramidula perspectiva Say. Rose Hill (Graham Farm).

Helicodiscus lineatus Say. Chippawa, Fort Erie, Rose Hill.

Polygyra tridentata Say. West Falls, Ebenezer, Windom, Machias.

Polygyra fraudulenta Pils. Ebenezer.

Polygyra albolabris Say. Springville, Machias, Chippawa, Foster's Flats, West Falls, Goat Isl.

Polygyra albolabris var. **dentata** Try. West Falls, Eighteen Mile ck

Polygyra exoleta Say. West Falls, Machias, Windom.

Polygyra dentifera Binn. Springville.

Polygyra palliata Say. Goat Isl., Rose Hill.

Polygyra thyroides Say. Rose Hill, Goat Isl., Foster's Flats, Windom, Springville.

Polygyra mitchelliana Lea. Goat Isl., Fort Erie.

Polygyra hirsuta Say. E. Aurora.

Polygyra fraterna Say. Goat Isl., South Buffalo betw. Ry. tracks, Windom, Foster's Flats, West Falls.

Vallonia pulchella Müll. Chippawa, Buffalo; universal.

Vallonia excentrica Stk. Lewiston, Lancaster, Chippawa.

Vallonia costata Müll. Buffalo (Bennett st.)

Vallonia perspectiva Stk. Chippawa.

Circinaria concava Say. Rocks below Falls, Niagara, Windom.

Pupa muscorum Linn. Buffalo (Hertel ave.), Rose Hill.

Vertigo ovata Say. Frenchman's ck., Cayuga Isl., Lime Lake,

Vertigo ventricosa var. **elatior** Stk. Government Woods, Ft. Erie.

Vertigo gouldi Binn. Rose Hill.

Cochlicopa lubrica Müll. Chippawa, Machias.

Bifidaria contracta Say. Lime Lake, Rose Hill, Lewiston, So. Bfo. bet. Ry. tracks.

Bifidaria armifera Say. Rose Hill, Lewiston, Fort Erie.

Bifidaria pentodon Say. Black ck., Ont.

Bifidaria curvidens Gld. Lime Lake, Concord.

Bifidaria holzingeri Stk. Rose Hill. (Lewis.)

Hyalina wheatleyi Bld. Buffalo (Bennett st.)

Pupoides marginatus Say. Rose Hill. (Lewis.)

Succinea retusa Lea. Niagara riv., E. Aurora, Strawberry Isl., Lewiston, Squaw Isl., Niagara Falls, Chippawa.

Succinea retusa var. **peoriensis** Wlf. Eighteen Mile ck., Cayuga Isl., Strickler's Squaw Isl., Niagara Falls.

Succinea avara Say. West Seneca, Lewiston.

Succinea ovalis Say. Fort Erie, West Falls, Cayuga Isl.

Limnaea stagnalis Linn. Niagara riv., Squaw Isl.

Limnaea columella Say. Park Lake Buffalo, Lime Lake, Concord.

Limnaea reflexa Say. Chippawa ck.

Limnaea palustris Müll. South Buffalo, Fort Erie Trenches, Williamsville.

Limnaea elodes Say. Williamsville, Goat Isl., Niagara riv., Concord, Fort Erie Ponds.

Limnaea desidiosa Say. Rose Hill, Squaw Isl., Erie Canal, Lime Lake, Muddy ck., Hertel and Elmwood aves. Buffalo.

Limnaea catascopium Say. Lake Erie at Rose Hill, Erie Canal, Niagara Falls, Frenchman's ck.

Limnaea pallida Ads. Fort Erie Ponds, Frenchman's ck.

Limnaea humilis Say. Concord, Lancaster, Strickler's.

Limnaea owascoensis Bkr. Lime Lake, Lewiston, Lancaster, Squaw Isl.

Limnaea gracilis Say. Strawberry Isl., Niagara riv. (Locality lost.)

Physa gyrina Say. Springville, Concord, Ft. Erie, Buffalo (Hertel ave., Strickler's, So. Ogden st.)

Physa elliptica Lea. Goat isl., Squaw Isl., Frenchman's ck., Lime Lake, Ft. Erie Trenches.

Physa hildrethiana Lea. So. Bfo. bet. Ry. tracks, Chippawa, Hamburg, Lewiston, Concord.

Physa sayii Tapp. Niagara riv., Frenchman's ck., Erie Canal, Lime Lake, Ebenezer, Ft. Erie, Chippawa ck., Pond Elmwood and Forest ave. Buffalo.

Physa heterostropha Say. Universal in all stations.

Physa integra Hald. Lancaster, E. Aurora, West Falls, Frenchman's ck.

Physa niagarensis Lea. Lake Erie, Niagara riv.

Aplexa hypnorum Linn. Williamsville, Concord.

Planorbis campanulatus Say. Lime Lake, Niagara riv.

Planorbis trivolvis Say. Universal in all stations.

Planorbis bicarinatus Say. Universal in all stations.

Planorbis exacutus Say. Concord, Lime Lake, Cayuga Isl., Erie Canal.

Planorbis dilatatus Gld. Lime Lake.

Planorbis albus Müll. Erie Canal.

Planorbis parvus Say. Ft. Erie Trenches, Frenchman's ck., Lime Lake, Williamsville, Lewiston, Chippawa.

Planorbis umbilicatellus Say. Ft. Erie Trenches, Squaw Isl.

Segmentina armigera Say. E. Aurora, Strickler's, Lewiston.

Ancylus parallelus Hald. Chippawa.

Ancylus tardus Say. E. Aurora.

Ancylus eugraptus Pils. Squaw Isl., E. Aurora.

Sphaerium simile Say. Ft. Erie Trenches, Niagara riv., E. Aurora, Chippawa ck.

Sphaerium rhomboideum Say. Erie Canal.

Sphaerium striatinum Lam. Cazenovia ck., Niagara riv., Ft. Erie Trenches, Chippawa ck.

Sphaerium solidulum Pr. Niagara riv.

Sphaerium occidentale Pr. Ft. Erie Trenches, Cazenovia ck., Concord, West Seneca, Lewiston.

Sphaerium stamineum Conr. Cazenovia ck., Chippawa ck., Williamsville.

Sphaerium fabale Pr. Niagara riv.

Calyculina transversa Say. Cazenovia ck., Buffalo (So. Ogden st.)

Calyculina partumeia Say. Ft. Erie Trenches.

Calyculina truncata Say. So. Bfo. bet. Ry. tracks, Concord.

Calyculina securis Pr. Ft. Erie Trenches, So. Buffalo, Lime Lake, Chippawa ck.

Pisidium abditum Hald. Lime Lake.

Pisidium virginicum Brg. Chippawa ck.

Pisidium nova-eboracense Pr. Frenchman's ck.

Pisidium compressum Pr. Lime Lake, Lancaster.

Pisidium variabile Pr. Chippawa ck.

Pisidium walkeri Stk. Chippawa ck.

Pisidium roperi Stk. Lime Lake.

Pisidium rotundatum Pr. Lime Lake.

Lampsilis ventricosus Barnes. Niagara riv., Lake Erie, Cayuga ck.

Lampsilis ochraceus Say. Cayuga ck.

Lampsilis multiradiatus Lea. Niagara riv.

Lampsilis luteolus Lam. Niagara riv., Cazenovia ck., Cayuga ck., Old Reservoir Prospect ave.

Lampsilis radiatus Gmel. Lake Ontario.

Lampsilis ligamentinus Lam. Niagara riv.

Lampsilis anodontoides Lea. Niagara riv.

Lampsilis rectus Lam. Buffalo ck.

Lampsilis nasutus Say. Niagara riv., Buffalo ck., Erie Canal.

Lampsilis subrostratus Say. Niagara riv.

Lampsilis iris Lea. Buffalo ck.

Lampsilis alatus Say. Lake Erie, Buffalo ck.

Lampsilis gracilis Barnes. Buffalo ck.

Lampsilis laevissimus Lea. Cayuga ck.

Obovaria ellipsis Lea. Niagara riv.

Ptychobranchus phaseolus Hild. Niagara riv., Buffalo ck.

Strophitus edentulus Say. Cayuga ck., Lancaster.

Anodonta cataracta Say. Park Lake, Bfo.

Anodonta marginata Say. Buffalo ck.

Anodonta grandis Say. West Seneca.

Anodonta grandis var. **gigantea** Lea. Buffalo Park Lake.

Anodontoides ferussacianus var. **subcylindraceus** Lea. Cayuga ck.

Symphynota compressa Lea. Niagara riv., Cayuga ck., Hamburg, Lancaster.

Symphynota viridis Conr. Niagara riv.

Symphynota costata Raf. Niagara riv., Buffalo ck., Cayuga ck.

Alasmidonta calceola Lea. Niagara riv., Buffalo ck.

Alasmidonta marginata Say. Niagara riv.

Unio gibbosus Barnes. Lake Erie, Niagara riv.

Quadrula undulata Barnes. Cayuga ck.

Quadrula pustulosa Lea. Niagara riv.

Quadrula rubiginosa Lea. Niagara riv., Cayuga ck., Williamsville, Buffalo ck.

Quadrula coccinea Conr. Lake Erie, Niagara riv.

ANNUAL MEETING

of the

Buffalo Society *of* Natural Sciences

May 15, 1908.

At the Annual Meeting of the Buffalo Society of Natural Sciences held May 15th, 1908, at which, in the absence of the President, Dr. Lee H. Smith, first Vice-President presided, the address of the President, Hon. T. Guilford Smith, LL. D. was read and was in part as follows:

"The year just closing marks an era in the history of this Society. The death in 1906 of the widow of the late Dr. George E. Hayes led to the division of that portion of his estate which was payable to his daughter Mrs. Charles H. Smith and ourselves as the two residuary legatees under his will. Through the efforts of Mr. Charles D. Marshall, Treasurer, whose recent death it is my sorrowful duty to mention, and of his colleagues the other Commissioners of the Permanent Fund, a satisfactory agreement and settlement was effected with the Executors of Dr. Hayes' estate and with their legal advisers and a division of the properties and securities effected as between ourselves and the other legatee, so excellently arranged that both parties were fully satisfied with the fairness of the arrangement. It is, however, proper to state that a considerable portion of this property is not at present income producing, although in time it is hoped it may become so. The amount of available income being thus limited, it is of the utmost importance that we so increase our sustaining membership that we may be enabled to continue the work we have begun. The need for this is emphasized by the fact that anticipating the provisions of Dr. Hayes' bequest, which was to provide free instruction in natural science, we began this Hayes School work in 1905 by employing a lecturer and arranging with the Superintendent of Public Instruction to have the grammar school children of this city come here for all the nature study, physiology, etc. required of the schools by the State. For these illustrated lectures we have also supplied the lantern slides, the materials and apparatus for the illustrative experiments and have arranged special exhibits from our collections adapted to the needs of each of the several grammar school grades. This work more than encroached upon our slender resources and had it not been for the willingness of the executors of the Hayes Estate to advance us money and of one of our banks to do the same, it could not have been so successfully carried on. These loans must therefore be repaid before we can enjoy an increased income from our permanent funds.

Until this year the Society has been compelled to rely for most of its activities upon the several standing committees of the Board who have attended to their duties with as much faithfulness as was consistent with the fact that they were composed of men actively engaged in business who could only give somewhat perfunctory attention to our matters.

During the past year and so soon as the Board of Managers found that their probable income would warrant it they elected Mr. Henry R. Howland as Superintendent with the result that during the portion of the year in which he has given his entire time to the Society's needs, there has been a marked improvement in its affairs, heretofore under committee management. Mr. Howland's report will give you some of these details.

The report of the Recording Secretary, Dr. Cummings, will give you details of the school lectures and that of the Director of the Museum will tell you of additions to the collections which come more rapidly than our space provides for their reception. The endeavors of our old and valued member, Mr. Ottomar Reinecke, has supplied us with fine specimens of mammals and further additions are contemplated.

Superintendent's Report.

The Report of the Superintendent, Mr. Henry R. Howland, covering the work of the Society for the past year covered in detail the arrangement with the Department of Public Instruction by which the grammar school children come to our lecture room mornings and afternoons through the school year for the well illustrated nature study talks given by our lecturer, Dr. Carlos E. Cummings. The year's work has shown a series of 234 of these nature study lectures with an attendance of nearly 20,000. Five special evening lectures upon Human Physiology intended for teachers and for advanced pupils have been given by Dr. Cummings covering "The Elements of the Body", "Foods", "Circulation", "Mechanics of the Body" and "Microscopical Anatomy". In preparing for these we added very largely to our supply of experimental apparatus, so that we are fully equipped to give the school children all the experiments suggested by the Regents' Syllabus. We have also added to our illustrative material for the other nature study lectures. The glass sided hive of bees has been in constant use and about forty new and very beautiful lantern slides have been prepared by Dr. Cummings from negatives taken by him showing the bees visiting the blossoms in search of honey and pollen. We have also added about twenty five new slides showing bird pictures to our previous collection used in the bird lectures.

A series of special exhibits for the several grammar grades has been prepared in the former lecture room. For the fifth grade are shown specimens of the minerals of the United States; for the sixth grade, tropical products, such as Rubber, Vanilla, Cocoa, etc.; for the seventh grade, bird enemies; for the eighth grade, Indian implements and weapons and for the ninth grade, collections illustrating the structure of bones and other matters pertaining to physiology work. All are of interest to the school children and are daily visited by the classes.

During the summer Dr. Cummings visited the Yellowstone Park and Colorado in the interests of the Society, securing about five hundred negatives, most of which have been made into lantern slides and added to our lecture supply.

Our regular Friday evening lectures which began October 25, 1907 and ended May 8, 1908 have been exceptionally interesting and instructive. There have been twenty three of these in addition to the five evening lectures by Dr. Cummings already mentioned. As will be seen by the list which follows many distinguished lecturers have favored us and have drawn large and appreciative audiences.

The Superintendent has made an earnest effort during the year to interest the High Schools and Union Schools of Erie County outside of Buffalo in our free educational work and letters have been sent to all the principals, to the Presidents of the local School Boards and to all of the Supervisors from the County towns, inviting the pupils to our school lectures. The slight expense of the journey however seems thus far to have deterred them from coming.

During the year a number of changes and betterments have been made in our rooms. The walls and ceilings in the basement and in the third story lecture room have been cleaned and kalsomined making them much lighter and more cheerful. The plumbing for toilet and dark room water storage supply in the third story has been remodelled to good effect; the basement rooms have been wired for electric lighting as have also the office and library.

In March, 1908, we were notified by the Department of Public Works that our lecture room in the third story must not be used for public assemblies unless a fire escape was provided. Thereupon we so changed about the cases of mineralogical and geological specimens in the rear basement room as to give us a very good seating capacity and have used that for our lectures very satisfactorily since that time.

The Director of the Museum has nearly finished the tedious work of arranging and cataloguing our valuable Conchological collections. We have purchased an additional cabinet case with storage trays for use in that connection; have had two upright cases repaired and refitted and by arranging them to that end have thus partitioned off a convenient, well lighted room at the western end for Dr. Letson's use and have thrown open the now attractive shell room to visitors and students. We have transferred some of our archæological exhibits to the former lecture room and have found a place in one of the bird cases for the interesting tree trunk showing the work of the Pileated Woodpecker.

At the time of my appointment as Superintendent, October 1st, 1907, our membership list had sunk to its lowest ebb. We had at that time 48 life members and only 150 annual (paying) members. After preparing the Historical Sketch of the Society which was issued as one of our Bulletins and sent out in November 1907, I began an aggressive campaign by letters and by such personal visitations as I could find time for, seeking to build up the membership. This has resulted thus far (May 15, 1908) in adding seven new life members and 337 new annual members and I am confident by a reasonable effort many more may still be secured.

During the year three Bulletins have been issued: — Vol. VIII, Part 5 in June 1904, Notes on Jamaican Hemiptera by E. P. VanDuzee: Vol. VIII, Part 6, in November 1907 being an Historical Sketch of the Buffalo Society of Natural Sciences by Henry R. Howland and Vol. IX, Part 1, in April, 1908, which contains four valuable scientific papers.

The accessions to our library during the year have been as follows:

Bound Volumes . . . American 87, Foreign 2
Unbound Volumes and publications received in exchange from our Bulletins . American 1102, Foreign 530

353 Volumes of unbound American scientific publications have been bound by Henry Straub under a favorable contract.

The Society has been represented by the Director of the Museum at the meeting of the Seventh International Zoological Congress in August 1907, at the meetings of the American Association of Museums in June 1907 and May 1908 and at the Founders Day Exercises of the Carnegie Institute, Pittsburgh and by the Superintendent at the meeting of the American Oriental Society at Cambridge, Mass. in April 1908.

The loss of three of our members during the year is deeply felt. Mrs. Charles H. Smith was the daughter and executor of our benefactor Dr. George E. Hayes and was the willing almoner of his bounty; her gentle Christian character had endeared her to all who knew her.

Mr. Charles D. Marshall was one of the original founders of our Society in 1861; he was one of its incorporators in 1863 and since the Board of Permanent Fund Commissioners was first organized, he has been Treasurer of that Fund. The Society has had no more faithful friend.

Dr. Charles A. Ring was greatly esteemed by all associated with him.

Much time has been given to systematizing the business affairs of the Society, giving personal oversight to all orders placed for supplies or work, insisting upon a prompt rendering of bills and arranging for their equally prompt payment when audited by the Board of Managers and approved by the Finance Committee: Our expenditures must be kept within our income and our bank indebtedness for money loaned that we might the earlier begin the educational work contemplated by Dr. Hayes' will, should be steadily reduced each year. As you will see we have paid $500.00 upon that indebtedness this spring.

The following schedule shows the details of the school lectures during the year.

SCHEDULE OF SCHOOL LECTURES, MAY 15, 1908.

No.	Topic	Grade	Date begun	Date ended	No. of Lectures	Attendance
I	Bees	7	May 13	June 14	19	3092

SUMMER VACATION.

II	Physiology	9	Dec. 2	Jan. 22	29	1073
III	Tropical Products	6	Dec. 2	Jan. 31	30	2923
IV	Birds	7	Feb. 11	Mar. 20	42	3468
V	Coal and Iron	5	Mar. 31	May 25	49	3900
VI	Physiology	9	May 15	June 15	30	1000
VII	Bees	7	May 15	June 15	30	3000
VIII	Special Physiology	All	Feb. 13	Apr. 2	5	1000
All figures from May 1, are estimated.					234	19456

Evening Lectures Delivered Before The Buffalo Society of Natural Sciences

1907-1908

1907.

Oct. 25, Peter A. Porter,
"Powdered Milk and Dairy Products."

Oct. 30, Col. Wm. F. Morse,
"The Disposal of Municipal Waste by Modern Methods."

Nov. 22, H. R. Howland,
"The Old Caneadea Council House and Its Last Council Fire."

Dec. 7. Dr. Frederick Starr,
"The Natives of the Congo Free State."

Dec. 13, Dr. C. E. Cummings,
"The Yellowstone Park."

Dec. 27, Dr. C. E. Cummings,
"The Nesting Habits of Birds."

1908.

Jan. 10, Dr. J. H. Penniman,
"The Appreciation of Nature by English Poets."

Jan. 17, Dr. C. E. Cummings,
"The Yellowstone Park." (2nd Lecture.)

Jan. 24, Dr. A. L. Benedict,
"The Kah-Kwahs."

Feb. 7, Robert M. Codd, Jr.,
"Cripple Creek,—A Miner's Mecca."

Feb. 14, Dr. Barton W. Evermann,
"By Packtrain To The Tip-Top of the United States In Quest of The Golden Trout."

Feb. 21, Prof. Charles F. Binns,
"Pottery. At Home and Abroad."

Feb. 21, Dr. A. T. Clay,
"Domestic Life in Nippur."

Mar. 6, H. R. Howland,
"The Folk-Lore of Zuni."

Mar. 13, Prof. Ellsworth Huntington.
"A Camel Trip in the Salt and Sand of Chinese Turkestan."

Mar. 20, Dilworth M. Silver,
"Who Were The Kah-Kwahs?"

Mar. 27, Dr. W. Max Muller,
"Races and Nations Known to the Ancient Egyptians."

Apr. 3, Frederick A. Vogt,
"The Migration of Birds."

Apr. 10, Dr. E. Porter Felt,
"Insect Life in its Relation to The Welfare of Man."

Apr. 18, Prof. Charles E. Fay,
"The Majesty of the Mountains."

Apr. 24, Prof. H. L. Fairchild,
"Glacial Effects in Western New York."

May 1, Frederick Houghton,
"The Flower Garden."

May 8, Prof. Willis L. Moore,
"Storms and The Story of the Air."

Recording Secretary's Report.

The Recording Secretary, Dr. Carlos E. Cummings, reported upon his work as lecturer for the Society during the year amplifying the report of the Superintendent, stating that the particular extension of the work over that of a year ago had been in the direction of the evening talks on Human Physiology. Primarily these lectures were intended for adults, but the attendance gradually included so many of the advanced High School pupils that they were eventually modified to meet that special need. It is gratifying to know that our endeavor is being appreciated by the advanced schools. The courses offered to the grammar schools have been practically the same as those of last year. We have endeavored to receive but one school at a time so as to avoid the confusion that sometimes arises from too large an assembly.

It is the intention gradually to divide this school work into three portions; first, the illustrated lectures as now given to the children; second, the well arranged exhibits showing the natural products of each country so classified and arranged that while adapted to the special consideration of the grade for which each exhibit is intended, the whole may be of interest to the classes coming here. This is already partly accomplished and our lectures are followed by a trip around our rooms under the teacher's guidance. Third, the travelling exhibits for schools for which, especially as concerns our native birds there is an increasing demand.

In the month of July, Dr. Cummings gave a series of lectures on Mexico at the Chautauqua Assembly and as has already been stated. visited the Yellowstone National Park and Colorado looking for new lecture material in furtherance of his policy to offer only that which is new and original in every case. The slides used are prepared in our own rooms and the negatives are secured solely with the idea of their use in the Society's work. Our dark room is considered one of the best in the country in its arrangement. The acquisition of a Graflex Camera has enabled the procuring of the fine picture of bees at work on the flowers and a large 8x10 A. S. reducing and enlarging camera purchased by Dr Cummings during the year makes our facilities for slide making very complete. The new dissolving stereopticon, also purchased by him, has been devoted entirely to the uses of the Society.

Director of the Museum.

The Director of the Museum, Miss Elizabeth J. Letson, Sc. D. reported the various donations to the Museum during the year including the gift by Mr. E. P. VanDuzee of the tree trunk showing the work of the pileated woodpecker; the head of an Asiatic Elephant given by Mr. George Bleistein and the interesting and valuable collection of Ethnological material from Nicaragua collected by Mr. J. F. Newell, U. S. Consul and presented to the Society by Mr. Philip S. Smith.

The long deferred work on the water lime group of fossils has now been begun by the State Museum. Dr. John M. Clarke, State Paleontologist and his assistant Dr. Ruedeman have visited our Museum and have studied our collection making the interesting discovery that ten of the Grote-Pitt type specimens which were supposed to have been removed from our collection still remain in our possession. Twenty six specimens have been sent to Albany for their Museum study to be followed by others when these are returned.

Continued inquiries from students of Geology for fossils from the Niagara Group led to a successful endeavor to secure the return of our specimens which had been loaned. The local outcrop of that period is now well represented in our Museum; other specimens have been added by Professor Fairchild from the Rochester outcrop and we anticipate that a fine and representative collection will be received from a generous friend in Wisconsin. The Hoyt collection of minerals, shells, etc. given us last year have now been unpacked and placed on exibition.

Our thanks are due to Mr. Richard F. Morgan for valuable assistance in identifying minerals and fossils.

In all 1784 new specimens have been added to our collections during the year.

Treasurer's Report.

The Treasurer Mr. Charles R. Wilson, reported as follows:—

1907.		
May 17,	Balance on hand	$ 597.58
	Income from Permanent Fund	925.00
	" " Hayes Fund	5,975.98
	Membership Dues	1,843.00
	City of Buffalo	1,000.00
	From sale of Bulletins	94.59
	Miscellaneous	11.95
1908.		
May 15.	Total amount of Receipts	$10,449 10

DISBURSEMENTS.

	Salaries	$4,477.34	
	Lecture expenses (including postage)	696.05	
	Printing and Stationery	694.58	
	Travelling expenses	449.42	
	Museum & Lecture supplies	801.92	
	Gas & electric lighting	217.09	
	Insurance	183.60	
	Cleaning rooms & small expense items	578.00	
	Herman Grieb, taxidermist	542.00	
	Frank L. Smith, Kalsomining	220.00	
	Interest on outstanding notes	527.00	
	Manufacturers and Traders' Nat. Bank to reduce demand notes	500.00	9,887.00
1908.			
May 15,	Balance on hand		$ 562 10

VOLUME IX. No. 3

BULLETIN

of the

BUFFALO SOCIETY OF NATURAL SCIENCES

"VERE SCIRE EST PER CAUSAS SCIRE"
ORG'D DEC. 5, 1861.

BUFFALO, NEW YORK
Press of Reinecke & Zesch, 352 Ellicott Street
1909

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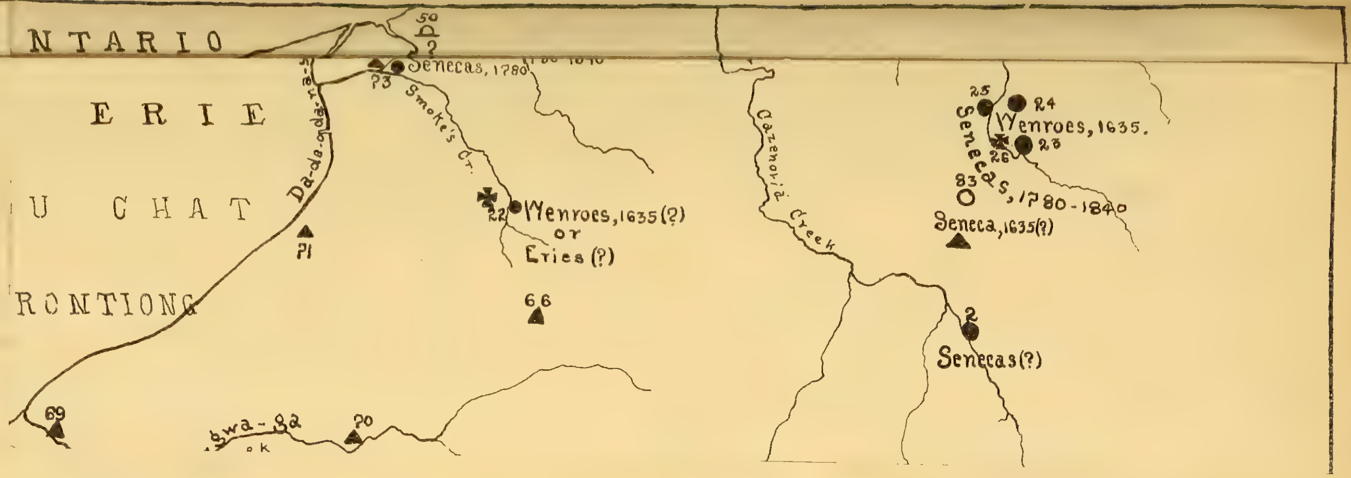
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Wenroes, 1635 (?)
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Cazenovia Creek
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Wenroes, 1635.
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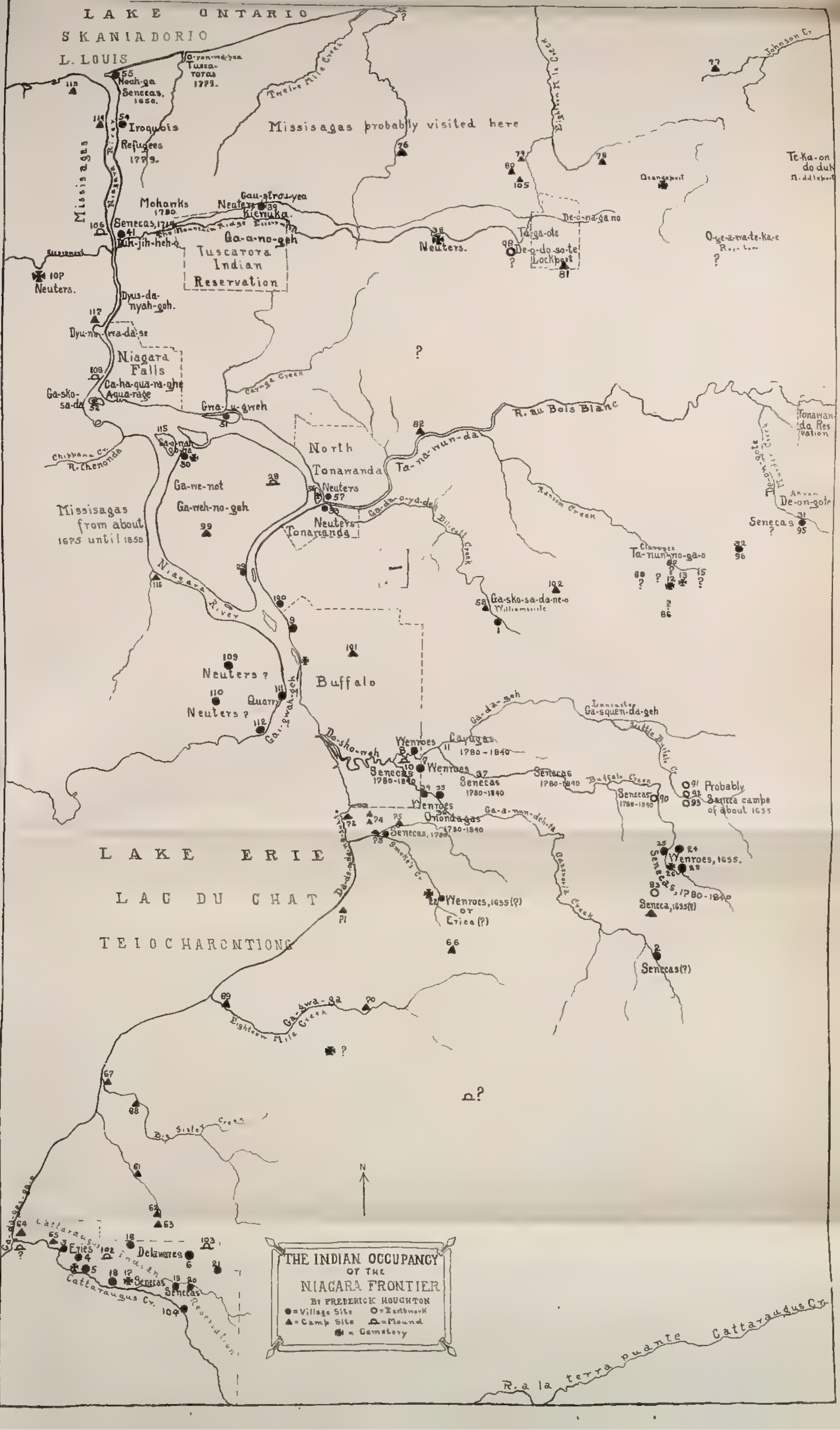
23
Senecas, 1780-1840
83
Seneca, 1635(?)
2
Senecas(?)



THE INDIAN OCCUPANCY OF THE NIAGARA FRONTIER

By Frederick Houghton

BULLETIN
of the
Buffalo Society of Natural Sciences

VOLUME IX. No. 3

Indian Village, Camp and Burial Sites on the Niagara Frontier.

By Frederick Houghton.

INTRODUCTION.

In the spring of 1907 the Buffalo Society of Natural Sciences requested Mr. Frederick Houghton to prepare for publication a list of Indian village sites in Erie County. Many of these had been identified in previous years by Mr. Houghton, and some of them he had carefully explored for the Society. It was thought that a record should be made of such as are already known and that, if possible, others should be sought out and identified and the list thus enlarged; for while it could not be hoped that any list would be complete, such a published record would serve as a reliable foundation upon which other investigators might build and an encouragement to such explorers in their intelligent efforts.

Mr. Houghton very willingly undertook the task assigned him and spent the summer of 1907 in preparing the list which follows. Letters were written to all of the public school teachers and to many others in the County outside of the City of Buffalo, the endeavor being to enlist their interest that the resulting reports and suggestions might open the way, as they did, for Mr. Houghton's personal investigations. The outcome proved gratifying and wherever it was possible Mr. Houghton, accompanied by Dr. R. E. DeCeu, who became deeply interested and rendered most valuable assistance, visited the suggested localities, identified the village, camp and burial sites, corrected errors which had already crept into print and made a definite and reliable record of results. In 1908 similar studies were made of Niagara County and of the adjacent Canadian frontier and further explorations were made in the summer of 1909.

The most important attempt at a connected record of Indian village sites in this region which has hitherto been made, is that included in the valuable bulletin by Rev. Wm. M. Beauchamp upon the "Aboriginal Occupation of New York" published by the State Museum in 1900. Dr. Beauchamp drew for his information upon such published references as occurred in E. G, Squier's Aboriginal Monuments of New York, Turner's History of the Holland Purchase, Johnson's History of Erie Co., etc., as well as upon occasional personal inspections and also reports of others which he could not verify. The present list will correct some of the errors which naturally occurred in the publications referred to. It has been confined to Erie and Niagara Counties and to the Canadian frontier near the Niagara River, because it was thought that correct work within that definite territory would be preferable to a more extended and less accurate survey, and because the State Museum has already entered upon important archaeological investigations in the adjoining counties of Cattaraugus and Chautauqua. The State Archaeologist, Mr. A. C. Parker has been most considerate in furnishing Mr. Houghton with his report of certain village sites in Erie County which had become known to him. A similar kindness has been shown by many others whose interest in Archaeology has enabled them to render assistance and to supply important reports. An unselfish desire to enlarge the bounds of knowledge has in almost every case prevailed and that desire has guided Mr. Houghton in preparing the list which follows.

HENRY R. HOWLAND,

October 1st, 1909. *Superintendent.*

The Indian Occupancy of the Niagara Frontier.

By FREDERICK HOUGHTON.

The Niagara Frontier Defined.

"The Niagara Frontier" is used in this monograph to comprise the region bordering the Niagara River and the foot of Lake Erie. It includes, in New York State, Erie County and Niagara County; and, in Ontario, the eastern townships of Lincoln and Welland Counties. In New York it extends southward from Lake Ontario as far as Cattaraugus Creek, and in Ontario from Lake Ontario to Lake Erie.

The Physiography of the Region.

The region is a rolling plain, bordered on the south-east by hills which, in the southeastern corner of Erie County, rise to the height of fifteen hundred feet above sea-level or about one thousand feet above Lake Erie, (1). Extending south from Lake Ontario is a rather flat plain elevated 50 feet above the lake. This is interrupted on the south by the steep escarpment of the Niagara and Clinton Limestones, which rises abruptly for about 200 feet above the Ontario plain. This escarpment extends like a wall east and west parallel to the shore of Lake Ontario, entirely across the region. It is known locally as the "Mountain Ridge" and will be so referred to in what follows.

Extending southward for fourteen miles from the crest of this escarpment is a flat plain; on the eastern side of the Niagara River forming the wide flat valley of Tonawanda Creek; on

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1. Concord Summit is 920 feet above Lake Erie; Sardinia, 891 feet. — *French, Gazetteer of the State of New York, P. 279.*

Lake Erie is 573 feet above the sea; Lake Ontario 246 feet above the sea; the crest of "Mountain Ridge" at Lockport 600 feet; the "Ledge" on Transit Road 700 feet.—*Topographic Map of U. S. Geological Survey.*

the western side a flat plain tilted eastward towards the Niagara River, and extending as far as Lake Erie. On the eastern side of the Niagara the plain is bounded by the escarpment of the Onondaga limestone, which, between Williamsville and Akron, rises to a height of from eighty to one hundred feet. This escarpment is known locally as the "Ledge" and will be so referred to here.

South of this escarpment the land becomes a rolling plain diversified by hills of glacial origin, and rises gradually to the hills on its southeastern border.

The Ontario plain is drained by numerous small streams which head at or near the "Mountain Ridge" and flow into Lake Ontario, It is cut into two portions by the lower Niagara River.

South of the "Mountain Ridge" the plain is drained by several streams which fall into the Niagara River. On the eastern side of the Niagara the largest is Tonawanda Creek, a considerable stream; on the western side the largest is Welland River (Chippawa Creek).

South of the "Ledge" the plain is drained by Buffalo River, and its branches Cayuga and Cazenovia Creeks; also by Smoke's Creek, Eighteen Mile Creek, Cattaraugus Creek and several smaller streams.

Several of the streams have cut valleys of considerable depth. The great chasm of the Niagara River is cut through the limestone that forms the "Mountain Ridge", the Falls of Niagara and its rapids making a long portage necessary.

The region is underlain by rocks of the upper Silurian and Devonian systems but these are covered for the most part, by glacial debris, which is modified in many places by the action of water. The rocks crop out at two escarpments, also at the foot of Lake Erie, and in the stream beds. Excepting the clays of the region the only rock of importance to the Indians was the chert-bearing Onondaga limestone.

The region was well adapted to be the home of a great Indian population. Its fertile plains rewarded the primitive agriculturist, while its great forests invited to the chase. Its streams furnished an easily obtained supply of food and afforded excellent waterways which not only penetrated to all parts of the region, but formed a great thoroughfare to far distant nations.

Our Knowledge of the Indian Occupancy.

The aboriginal inhabitants of the Niagara Frontier are known to us through history and archaeology. The early history of the region abounds in references to the Indians who lived in it, which are sometimes accurate but oftener confused, inaccurate, indefinite, and insufficient. Some of the nations dwelling there were strong, and able to thwart the designs of the Europeans who coveted the region. These nations were carefully studied and accurately described. Others were unimportant, or were destroyed before any accurate account of them was ever made. Some were never visited by Europeans who might have left a record of their nation. In many cases descriptions of these are based on accounts received indirectly, perhaps from some ignorant trader, perhaps from some Indian of another tribe, and naturally such a record is at best vague and unsatisfactory.

From the remains that they left behind them we may learn much about their life, their customs and manners of living. It is only by the aid of history, however, that we may establish the identity of a people through archaeology.

Historical Occupants of the Niagara Frontier.

The accounts of explorers, missionaries, soldiers and traders show that the Niagara Frontier was occupied by the Neutral Nation, the Eries, the Wenrohronons, the Senecas, the Mississagas and the Tuscaroras. Owing to the work of the Jesuit Missionaries amongst the Neutrals, and to the prominent part taken by the Senecas in Colonial times, these two nations are well known through history. The Eries and Wenrohronons disappeared before anything was definitely known of them. The Mississagas and Tuscaroras came to the Niagara Frontier within the historic period.

The Neutral Nation.

The Neutral Nation was one of the largest of the divisions of the Huron-Iroquois family. During the short time it was known to Europeans it occupied the Niagara Frontier. It perished through the ambition or the blood-lust of its kindred, the Iroquois.

The name, "Neutral Nation", by which it is best known, is the anglicized form of the French name, "Neutre Nation". This name was applied to it in 1615 by Samuel de Champlain, because, in the incessant warfare carried on between the Hurons and the Iroquois, this nation, though on the main thoroughfare between the contending nations, remained strictly neutral; and not only did they observe neutrality themselves, but in their villages they enforced peace between any chance-met warriors of the belligerent nations. It mattered not how well merited was the vengeance or how close were the pursuers, inside the gate of a Neutral town a fugitive was safe.

The Hurons called the people of this nation Attiwandaronks, meaning, "People who speak a language slightly different from ours", or "Their speech is awry." (1). This was not a tribal name. A man of the Neutral Nation might properly apply it either to the Hurons or to the Eries. Probable variants of this name are the names "Atiraguenrek" and "Atirhangenrets" sometimes applied to them. The Senecas called them "Je-go-sa-sa", or the Cat Nation, (2), a name applied by the Jesuits to the Eries.

The Neutral Nation occupied the peninsula lying between Lake Ontario on the north, Lake Erie on the south and Lake Huron on the west. Champlain wrote of them: (3) "There is also at a distance of two days' journey from them (the Hurons) in a southerly direction, another savage nation that produces a large amount of tobacco. This is called the Neutral Nation. They number 4000 warriors and dwell westward of the lake of the Entouhonoronons".

According to Lalement, the Neutral Nation lay four or five days or 40 leagues south, possibly in latitude 42°30'. From the village nearest the Hurons to the "entrance of the river of that nation" (4) was four days south or southeast. Further he says: "There are three or four (villages) beyond (the river) ranging from east to west towards the nation of the Cat or Eriechronons". The last village on the east was Onguiaahra (5).

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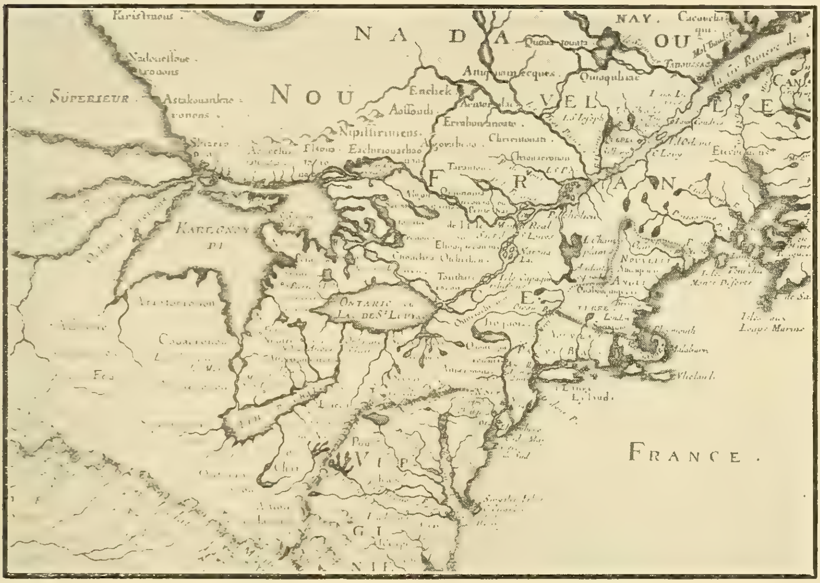
1. Bureau Am. Eth. Handbook of the Am. Indians, P. 585.
2. Morgan, Ind. Miscellanies.
3. Voyages of Samuel de Champlain, Scribner edition. P. 304.
4. Jesuit Relation, 1641-2, Vol. 21, Burrows edition.
5. Jes. Rel. 1641-2, Vol. 21, P. 209, Burrows edition.

Father Bressani said; (1) "Southward a little towards the west, came the neutral nation, whose first villages were not more than 100 miles distant from the Hurons; the territory of this nation extended through the space of 150 miles".

On Sanson's map of 1656, (2) two locations are noted for this nation. The name occurs west of the Niagara River and again far south of Lake Erie. Mr. Goldthwaite suggests (3) that the nation may have split to escape the Iroquois, one part fleeing southward.



From map by N. Sanson d'Abbeville. Paris 1656.
Marshall Library, Buffalo Historical Society.

According to John S. Clark, the Neutral country extended eastward across the Niagara River, north of Tonawanda Creek. In a later map Mr. Clark includes the Wenroes in the Neutral Nation and thus extends their territory as far east as Oak Orchard Creek. (4).

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1. Jesuit Relation of 1653.

2. In the collection of Mr. O. H. Marshall, now in the library of the Buffalo Historical Society.

3. Jesuit Relations, Burrows edition, Vol. 18, P. 235. Note 19.

4. In a private letter, Dec. 29, 1909.

J. G. Henderson is of the opinion that "the Neutrals occupied the north side of the lake (Erie) their territory extending perhaps across the Niagara River but never stretching around the end of the lake westward". (1).

Mr. Coyne, an authority on the Neutrals, included in that nation the "associate nation" of the Wenroes. He thus extends the eastern frontier of the Neutral Nation to within "a day's journey of the Iroquois" or to a point between Oak Orchard Creek and the Genesee River. (2).

From the foregoing data and opinions we may safely conclude that the Neutral country was bounded on the north by Lake Ontario and by an indeterminate line drawn from the head of this lake to a point on the shore of Lake Huron, south of Goderich. Eastward it extends across the Niagara River as far at least as Lockport. East of the Niagara it extended at least as far south as Tonawanda Creek, and perhaps to Eighteen Mile Creek; and west of the Niagara to Lake Erie. On the west it was bounded by the Detroit River, Lake St. Clair and St. Clair River.

Their country elicited praise from every visitor. It was "incomparably larger, more beautiful and better" than any of the surrounding countries. It abounded in game of all kinds. Beavers were so abundant that in one year Yroquet, an Algonkin hunter and 20 of his men, secured five hundred skins (3). Its streams and lakes were filled with fish. Its soil was excellent ("excellentes terres"); consequently the Neutrals were noted for the abundance of their squashes, beans, corn and tobacco." A very good oil which they call "Atouronton" was found there.

In this delectable land lived a numerous and sedentary people. In Father Dallion's time, 1626, the Neutrals lived in "twentyeight towns, cities and villages, made like those in the Huron country, and also several little hamlets of seven or eight cabins, built in various parts convenient for fishing, hunting or

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1. Quoted in note in Jes. Relations, Burrows edition. Vol. 21, P. 313 Note 11.

2. James H. Coyne, St. Thomas, Ont., in "The Country of the Neutrals", P. 10 of "Historical Sketches of the County of Elgin".

3. Father Joseph De La Roche Dallion's letter, 1627, from Torachin, Huronia, quoted in Father Chretien Le Clerq's, "First Establishment of the Faith".

agriculture" (1). In 1641 its population "according to the reckoning of the Fathers" was twelve thousand souls or four thousand warriors, living in forty villages and hamlets (2).

In their manner of living the Neutrals resembled the other branches of the Huron-Iroquois family. They lived in bark houses, dressed in skins, raised vegetables on their farms and supplemented their vegetable diet by game and fish. Though at peace with the Hurons and Iroquois they warred with nations living west of them. They buried their dead with ceremonies similar to those of the Hurons.

Though the "hamlets" spoken of by Father Dallion were probably composed of the conical bark wigwams, used amongst the Iroquois for temporary shelter, the towns were composed of bark "long houses" similar to those used by both Hurons and Iroquois. A "long house" was framed "like a grape arbor" of poles. The roof and walls were made of sheets of bark tied to the frame-work of poles; but so badly were they fastened that the wind and rain had free access. The earth served as a floor, and after a few years of occupancy this was foul with refuse. Opening into a rude porch at each end was a doorway, closed with a skin curtain. From door to door ran a narrow corridor, in which, at intervals burned a row of fires. Over each fire was a hole in the bark roof through which the smoke was expected to go. It usually failed however to do so and the acrid wood smoke that filled the houses, was in winter the greatest hardships of the missionaries. "I have sometimes for hours, wrote Father Brebeuf, remained in this position (lying on the floor face downward), especially when the cold was so intense that I dare not remain outside, and it seemed to me that my throat, my nostrils and my eyes were, during this time, in a constant state of inflammation. At times I thought I would go blind, my eyes were burning in my head and I could see around me only dimly and in a confused manner".

Along the sides of the house were the sleeping apartments. These were like horse-stalls, separated by bark partitions, but open on the side next the corridor. Benches, covered with mats or skins served as beds. Hanging from the rafters and

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1. Father Dallion's letter, quoted as above.

2. Father Lalement, in Jesuit Relations, 1641, Vol. 21, P. 191, Burrows edition.

from poles above the sleeping apartments were ears of corn and dried squashes.

Along the outer ends and sides of the house was rudely painted the symbol of the clan to which the occupants belonged. Outside at each doorway, was a malodorous heap of refuse, ashes and offal.

The Neutrals used clothing for warmth, not for decency. In the winter a small piece of fur sufficed. In the summer many wore no clothing at all. But though they adorned their bodies not at all with clothing, they decorated them by means of tattooing. Many covered their bodies with designs of birds, animals and imaginary monsters (1).

The operation of tattooing was long and painful (2). The operator first drew on the skin the desired design. Following the lines of the design he pricked the skin with a fine awl or a thorn and into the punctures he rubbed charcoal. When the punctures healed the design showed black through the skin.

Physically the Neutrals were strong and well-built (3). The missionaries noted with surprise that they were stronger, taller and better made than the Hurons. Father Dallion, in his stay of three months amongst them saw neither cripples nor deformed persons.

Though at peace with the Iroquois and Hurons, they were warlike, and in war were more cruel than even their cruel kindred. In 1638 their war-parties defeated the Mascoutins, and brought droves of captives back to their Neutral homes. Five years later two thousand Neuters captured a Mascoutin town after a bloody fight and burned many captives. They then cut off the lips and put out the eyes of the old people, and set them at liberty. The remainder they took home.

They admired courrage and honored brave warriors. Souharissen was absolute chief because of his brave deeds. "He acquired this honor", wrote Father Dallion, "by his courage, and having been repeatedly at war with seventeen nations, which are their enemies, taken heads or brought in prisoners from them".

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1. Father Lalement, Jes Rel. Vol. 21, P. 197, Burrows ed

2. Father Bressani, Jes. Relation 1653, "A Brief Account of Certain Missions", Chap 2, P. 251, in Burrows edition.

3. Father Lalement, Jes. Rel. Vol 21, P. 199, Burrows ed.

They were licentious and immoral. "Their life is impure", wrote Father Dallion. Their women were immodest; and they were unrestrained in their licentiousness. More even than the Huron women were they dissolute and shameless.

Peculiar to this nation was the large number of "lunatics" found amongst them. Great numbers of persons, actually or apparently mad, wandered about in the towns. Most of these were "more knaves than fools", for they only pretended insanity, thus to appease their own especial demons; or more probably, thought the missionaries, they could thus better further their own designs (1).

The Neutrals celebrated the "Feast of the Dead" much as did the Hurons. At intervals of about ten years the dead of a whole village, or even of several villages, were buried together, to the accompaniment of feasting and dancing, in a common grave. When any member of a family died, his relatives wrapped the body in fur, and until the odor of decomposition became unbearable, they kept it in their house. Then with few or no ceremonies, they bore the body to some near-by spot and laid it upon a scaffold. When it had entirely decomposed they scraped the bones clean, wrapped them once more in fur, and stored them in the house, there to remain until the "Feast of the Dead".

At some stated time, decided upon in council, the relatives took the bundle of bones, and any others that were in the house, and joined their neighbors, who bore similar bundles, in a solemn procession to the spot set apart for the ceremony. There a hole about ten yards square had been dug. On a given night, after days and nights of feasting, condolences and "dances of the dead", the relatives ranged the bundles along the edge of the hole. Speakers, lighted up by flaring torches, intoned the bravery and virtues of the dead. At a signal all the people rushed forward and cast their bundles into the pit and over them threw their most valuable and precious possessions. The pit was then filled with earth, covered with stones and surrounded with Palisades.

"Our Indians", said Father Brebeuf, "in the respect towards the dead and in the decency they observe in the practices held sacred in the country, are not behind many of our civil-

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1. Father Lalement, Jes. Rel., Vol. 21, P. 199, Burrows edition.

ized nations. One would think that the labor they engaged in and the traffic they undertook were done to acquire the means wherewith to pay distinguished honor to their dead. The prodigious quantities of furs, hatchets and wampum, and in fact the wealth of the country, are gathered for years for this great burial ceremony. I have seen many of them go almost naked, even in winter time, while in their tents were valuable furs which they were reserving as presents for their dead".

For some reason the Neutrals did not trade directly with either the French or the Dutch. Probably the Hurons, Iroquois and even the Algonkins, acted as middlemen, and being anxious to keep such a lucrative trade they put every obstacle possible in the way of direct intercourse. For instance, Father Dallion wished Yroquet, an Algonkin hunter to show him the marks at the mouth of the Niagara River, so that he could bring French traders to the Neutrals. Yroquet refused to show him. It was in that year that he and twenty of his followers had secured those five hundred beaver skins in the Neutral country and he did not wish competition. The Hurons saved their trade with the Neutrals by spreading reports of the French, calculated to arouse prejudice against them.

In spite of their efforts however, parties of traders from both Albany and Quebec reached the Neuters. Father Jerome Lalement stated that the French traded in the Neutral country; (1) and Dutch traders evidently penetrated to their eastern frontiers, for the Fathers were bitter against such parties who visited the Wenrohronons (2).

The Neuters had a thriving trade of their own. They raised tobacco and sold it to less favored nations; and their trading parties penetrated far to the south for "Vignots" the great conch shells which were among their most precious belongings, (3).

In 1615 Champlain gave to this nation the name by which it is known, and for a generation after that time the nation had observed the neutrality that had caused him to bestow that name. Because the stirring events of that generation made it impossible to longer preserve that neutrality and the immunity from danger dependent upon it, the nation perished miserably.

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1. Father Lalement, Jes. Rel. Vol, 21, P. 203, Burrows Ed.
2. Jes. Rel. 1653, Vol. 39, P. 141, Burrows edition.
3. Father Lalement, Jes. Rel., Vol. 21, P. 201, Burrows edition.

In the thirty years following Champlain's visit to the Hurons, events culminated rapidly on the Niagara Frontier. Missionaries came, preached vainly the Word of God and departed. A great epidemic thinned the villages. Eastward the frontier nation of the Wenroes abandoned their villages through fear of the Iroquois and passed through the Neutral villages on their painful journey to their new homes amongst the Hurons. Northward the Tionontates also, fearful of the Iroquois, had joined the Hurons in a league against their common foe. As the years went by the Iroquois war-parties passed more and more frequently along the Neutral trails on raids to the Huron country; and year by year the feud between the Hurons and the Iroquois became more rancorous and the sanctuary of the Neutral towns more difficult to maintain.

It was a generation of transition for the Neutrals. The warrior still pointed his arrows with flint points; but his javelin he armed with a French sword-blade. His stone axe he had discarded; in its place he bore the cross marked French axe. His sagamite simmered in a brass kettle; and his brawny chest displayed, not only the rudely carved pendant of conch shell, but the gay glitter of the trader's glass beads. The Gospel was being preached, at first and in vain, by Jesuits, later and successfully by their Huron neophytes.

It was in 1647 that, in spite of their strength and bravery the Neutrals found it impossible longer to preserve their neutrality. The five years previous had been years of terror for the Niagara Frontier. Every year Iroquois war-parties had swarmed in Huronia and in the Petun country. Huron trading parties were waylaid and massacred on the road to Quebec. Villages were raided, and Huron captives died in the fires of Iroquois towns. In 1646 a Seneca warrior, one of a war-party, killed a man of the Tobacco Nation on the frontiers of that nation. He was hotly pursued by a party of Hurons. He crossed the frontier and attempted to reach the safety of the Neutral town of Aondironnon but before he could enter a Neutral cabin he was captured and killed by his pursuers. Since he had not entered a cabin, neither the Hurons nor the Neutrals considered this a breach of neutrality. The Senecas resolved secretly on revenge, (1).

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1. Father Ragueneau, Jes. Rel. 1647-48, Vol. 18, P. 260, Burrows ed.

In 1647 (1) a party of Iroquois set out for Huronia in the company of an Onondaga party to avenge the supposed death of Arenraes, a prominent Onondaga. On the way they met Arenraes himself, who had not been killed as was supposed. The Onondagas turned back, but a band of three hundred Senecas, a portion of the party, decided to punish the people of Aondironnon. They reached that village during the summer. Since the Neutrals were not at war with the Senecas, the inhabitants received them hospitably and prepared food for them. The Senecas scattered amongst the houses and at a preconcerted signal began an indiscriminate slaughter of their Neutral Hosts. Many they killed. Many more they drove away to captivity or torture in the Seneca towns.

For some sufficient reason the Neutrals made no immediate effort to punish the Senecas for this treacherous deed. Evidently it served as a cause of war, for two years later, in 1649, six hundred Neutrals sent word to the Jesuits that they were coming the next summer "to solicit arms and help, being now in open war with the Iroquois", (2).

During the years 1650 and 1651 the Jesuits at Quebec heard rumors of this war. In the "Journal of the PP Jesuits" under the date of April 22, 1651 appears the following: "We receive letters from Montreal which say that forty Iroquois had appeared there on the first day of March but had been discovered; that after a number of shots fired on both sides they had said that last Autumn an army of 1500 Iroquois who had gone to the Neutral Nation, had swept away the village there; that the people of the Neutral Nation having fallen upon them under the guidance of Tahonta, enrat, 200 of the enemies had been captured or killed; and that, this winter, another army of 1200 had returned thither to avenge that loss. Four days later, April 26th, six soldiers of the "flying camp" arrived at Quebec and brought news "that only 600 Iroquois had dealt their blow to the Neutral Nation". On September 22, the bark St. Anne arrived from Montreal. In the bark were a Huron, Tsawenhohi and his Nephew. "They told as news, 1st, the capture of Teoto'ndiaton and the desolation of the Neutral Nation; quam alio modo narrabent from what we had been given to understand before."

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1. Father Ragueneau, Jes. Rel. 1647–48, Vol. 33, P. 81, Burrows ed.
2. Father Ragueneau, Jes. Rel. 1649 50, P. 215, Burrows edition.

The Tahonta, enrat mentioned was a clan of the Hurons located at Scanonaenrat, (1). Teoto'nidiaton was the Neutral village in which the Jesuits had located the mission of St. Guilliaume.

"The Iroquois have not waged so pittiless a war against us for a year as we had feared. They turned against the Neutral Nation whither they sent the bulk of their forces. They met with success, and captured two villages on the frontier, in one of which there were over 1600 men. The first was taken toward the end of Autumn; the second at the beginning of Spring. Great was the carnage especially among the old people and the children who would not have been able to follow the Iroquois to the country. The number of captives was exceedingly large especially of young women whom they reserve, in order to keep up the population of their own villages. This loss was very great and entailed the complete ruin and desolation of the Neutral Nation; the inhabitants of their other villages, which were more distant from the enemy, took fright; abandoned their homes, their property and their country, and condemned themselves to voluntary exile, to escape still further from the fury and cruelty of the conquerors. Famine pursues the poor fugitives everywhere, and compels them to scatter through the woods and over the more remote lakes and rivers, to find some relief from the misery that keeps pace with them and causes them to die", (2).

Although Father Ragueneau spoke so despairingly of the plight of the Neutrals, their spirit was not all broken by the reverses of that year. The next year, 1652, they allied themselves with the Andastes, an Iroquoian people who lived south of the Iroquois on the Susquehanna River. They were a warlike nation and were foes of the Iroquois. With their aid the Neutrals carried the war into the Seneca country. "Aasate an Algonkin brought back the following news: 1st, that the Neutrals had made an alliance with those of Andastoe, against the Iroquois. 2nd, that the Sonnontwe'ronnons, going to war against the Neutrals, had been defeated, so that the women had been constrained to leave Sonnontwan, and take refuge at Onionen", (3).

Of the other events of the year 1653 we know only that the Mohawks, who were at war with the French at that time wished

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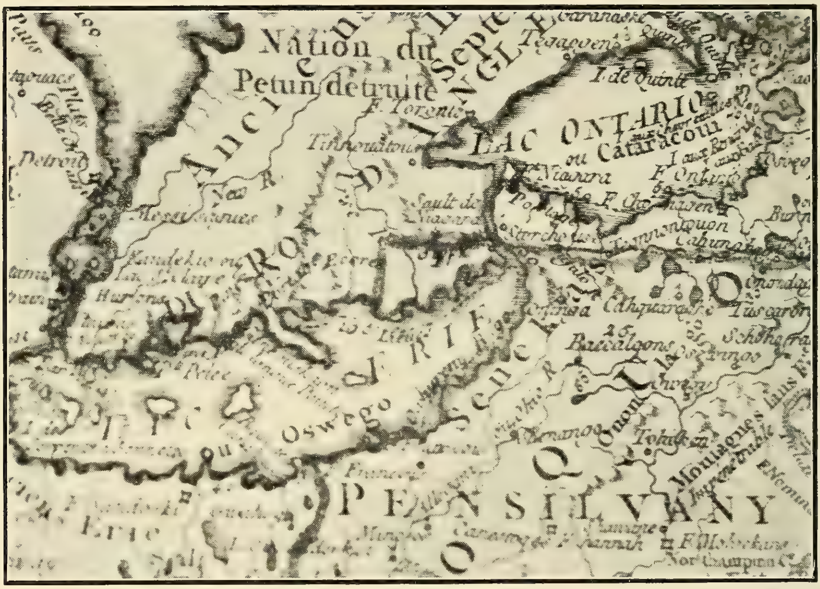
1. Note 35, Jes. Rel. 1651, Burrows edition.
2. Father Ragueneau, Jes. Rel. 1650-51, Vol. 36, P. 177, Burrows ed.
3. Journal of the P. P. Jesuits, 1652, Vol. 37, P. 97, Burrows ed.

the Senecas to help them. The Senecas agreed, on condition that the Mohawks would first help them to conquer the Neutrals. Accordingly the Mohawks invaded the Andaste country in force (1) and the Senecas concentrated their forces against the Neuters. These, seemingly, could not withstand their terrible foes, who once more carried the war to the country of the Neuters, and devastated it. Father Ragueneau thus reports the downfall of the Nation: "The Agneehronon Hiroquois (Mohawks) accepted this condition (that the Mohawks were to aid the Senecas) and sent their troops to join those of the Sontonaheronnons who with this assistance have destroyed the Neutral Nation which was on their borders", (2).



From map by M. le Chr de Beaurain, 1777.
Marshall Library. Buffalo Historical Society.

Abandoning their homes before the advance of the Senecas, the remnants of the Neuter people fled northward. In July 1653, some Huron refugees brought to Quebec news of the survivors (3). They reported that "all the Algonkin nations are assemb-

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1. Jes. Rel. Vol. 37, P. 97, Burrows ed.
2. Jes. Rel. 1652-53, Vol. 38, P. 63, Burrows ed.
3. Journal P. P. Jesuits, July 31, 1653.

ling with what remains of the Tobacco Nation and of the Neutral Nation at A'otonatendie, three days' journey above the Sault Skia'e toward the south. Those of the Tobacco Nation have wintered at Tea,onto'rai, the neutrals to the number of 800 at Sken'chio,e (1) toward Te,o'chanontian; these two nations are to betake themselves next autumn to A'otonatendiia where even now they number a thousand men''. Whether this league was productive of results no one can say. It is certain that after 1653 the Neutral Nation ceased to exist as a nation. That many had been killed in battle there can be no doubt. That many died in the fires of the Iroquois, who, knowing of the Iroquois can doubt? Many were adopted into the Seneca nation; and twenty years afterward, in 1669, Father Fremin (2) found in the Seneca villages, Neuter captives who had become Christians. Some were scattered amongst the other Iroquois. Father LeJeune preached to a congregation of them in a village of the Onondagas, (3). During the war a large number abandoned their homes and fled before the Iroquois. Some of these joined the Huron fugitives on the St. Lawrence, where they became Christians, (4). Others fled northward and joined their kindred the Tionontate refugees at Mackinac.

The Wenrohronons. (5)

During the early years of the 17th century, and for some time during the 16th century, the eastern portion of the Niagara Frontier was the seat of the Wenro Nation or Wenrohronons. Their occupancy of the Frontier during historic times was brief and no record remains of their life there.

The Wenrohronons are first definitely mentioned by the Jesuit missionary, Father Brebeuf. In a letter which he wrote in 1635 from the Huron town of Ihontiria, he expresses his

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1. Sault Skia'e is Sault St. Marie.

Skenchio'e tuati Pointe appears on a map of 1777 by le Chevr de Beaurain, on the west shore of L. Huron, in Michigan. This map is in the Marshall Collection at Buffalo Historical Society's library.

2. Jes. Rel. Vol. 57, P. 191, Burrows ed.

3. Jes. Rel., 1656-58, Vol. 44, P. 41, Burrows ed.

4. Registre des Baptemes de Paroisse de Ville Marie 1659-51. Quoted by the Very Rev. Wm. R. Harris in "History of the Early Missions in Western Canada".

5. Ahouenrochrhonons, Ahouenrochronons, Awenrherhonons, Oenronronnons, Ouenro nation, Weanohronons, Wenrohronons, Wenroronons.

delight at learning that the Huron language was common to "some twelve other nations, all settled and numerous", one of these twelve being the Wenrohronons, (1).

Four years after this their occupancy of the Niagara Frontier terminated. In 1639, Father Lalement, writing from Oss-ossane, in the Huron country, said: (2) "The Wenrohronons formed in the past one of the associate Nations of the Neutral Nation and were located on its boundaries, toward the Hiroquois, the common enemies of all these peoples. As long as this Nation of Wenrohronons was on good terms with the people of the Neutral Nation, it was sufficiently strong to withstand its enemies, to continue its existence, and maintain itself against their raids and invasions; but the people of the Neutral Nation having, through I know not what dissatisfaction, withdrawn and severed their relations with them, these have remained prey to their enemies; and they could not have remained much longer without being entirely exterminated, if they had not resolved to retreat and take refuge in the protection and alliance of some other Nation."

Accordingly they sent to the Hurons ambassadors, who begged in the name of their nation that they be allowed to join the Hurons. The Hurons heard the ambassadors in council and after deliberation invited the Wenrohronons to leave their ancient seat and remove to Huronia.

The long and painful journey around Lake Ontario was accomplished. Immediately upon the return of the ambassadors with the welcome invitation, the people shouldered their belongings and set out upon their journey. They crossed the Niagara River and passed through the Neutral country to the head of Lake Ontario. When they neared the Huron villages they were met by hundreds of Hurons who, moved by compassion, had come to help the unfortunates. Slowly the worn out, emaciated and plague stricken band of refugees was led to the Huron country where a village was assigned to them. They were immediately visited by the missionaries who healed their sick, comforted them in their misfortune, and preached the Word of God, baptizing many, (3).

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1. Jes. Rel. 1635, Vol. 8, P. 115, Burrows ed.
2. Jes. Rel., 1639, Vol. 17, P. 25, Burrows ed.
3. Jes. Rel., Vol. 17, P. 25–27, Burrows ed.

Even in the Huron country they were not safe. Ten years later their village was burned by the Iroquois and its people, once more homeless, was scattered. Some fled with the remnant of the Hurons. Some were taken captive by the Iroquois war-parties and carried back to New York. Many years later Father Garnier found amongst the Senecas in the mission of St. Michael, an "old man of the Ouenro nation" whom he baptized, (1).

Before leaving their homes on the Niagara Frontier, these Wenrohronons had been in touch to some extent with Europeans. The Jesuits in their Relation of 1653 complained bitterly that the Wenrohronons who had lately come into the country had formerly traded with the "English, Dutch and other heretical Europeans" (2) and that these had warned the Wenrohronons against the "Black-robes" who were, they said, "wicked people". Evidently traders from Albany before 1639, had entered their country.

The exact location of their country can only be inferred. Father Lalement said that they lived on the boundaries of the Neutral Nation "toward the Iroquois".

The Senecas.

The Seneca Nation when first known to Europeans, occupied a region Eastward of the Genesee River with outposts on that river and west of it. They were of Iroquoian stock and like all the others of that family they were sedentary, warlike, cruel and ambitious. A war, not of their own making finally drove them from their seats on the Genesee River and they settled on the Niagara Frontier.

The meaning of the name "Seneca" is unknown. The Dutch who first used it probably heard it used by the Algonkins along the Hudson River; and its root seems to be the Algonkin word "sinni", meaning "to eat". It perhaps carries the same grim meaning as does its kindred name "Mohawk", the "eaters of men. This meaning, however, is doubtful.

The Delawares are alleged to have applied to them the name "Sinako", meaning "Mountain snake", but their Delaware

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1. Jes. Rel., 1673, Vol. 57, P. 197, Burrows ed.
2. Jes. Rel. 1653, Vol. 39, P. 141, Burrows ed.

name is ''Maechachtinni'', meaning ''Mountaineers, (1). This meaning is kept in the French name for the Senecas ''Tsonnontouans'' or ''Sonnontouans'', which is said to mean ''the people of the great hill''. This is said to be derived from the Seneca words ''onondah'', meaning hill, and ''go waah'', meaning great, (2). Champlain called them the ''Eutonhonorons'' and ''Chouontouaroüon'' (3) though in these names he included also all the Iroquois except the Mohawks. To the Chippewas the Seneca were ''Nottoways'' or enemies, and the Catawbas called them ''Nottawagees'' with the same meaning.

The name applied to the nation in Council was ''Ho-neen-ho-hone-tah''. This word varied in the different dialects of the Six Nations but its meaning in all cases was, ''Possessing a Door'', (4).

No date can be set for the entry of the Senecas into New York State. There seems to be no doubt that they were late comers; and it is reasonably certain that they supplanted, or drove out, an Algonkin people. They were the last to join the Iroquois League and, until the Tuscaroras entered, they were called ''The Youngest Son''.

Also unknown is their origin. It has been suggested that they were a branch of the Eries. Probably they were offshoots of the Huron Nation, whose seat was north of Lake Ontario. The Hurons are thought to have thrown off offshoots, part of whom, the eastern Iroquois, Mohawks, Onondagas and Oneidas, followed Lake Ontario eastward, settled for a time on St. Lawrence River, where Jacques Cartier reported seeing them in 1534, and thence, pushed southward by Algonkins, entered New York. The Onondagas followed Lake Ontario and settled on its southern shores. The Mohawks followed Champlain southward to the Hudson Valley. The Senecas, in company perhaps with the Cayugas, after leaving the Hurons, turned the western end of Lake Ontario and followed the shore eastward. They may have been pushed forward by still another offshoot, the Neuters; more probably these had preceded the Senecas and had already settled in the Niagara Peninsula through which they granted passage to

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1. Wm. T. Beauchamp in "History of the N. Y. Iroquois", P. 163, referring to Horatio Hale and E. G. Squier.
2. O. H. Marshall, Historical Writings, P. 233.
3. Voyages of Samuel de Champlain. P. 304 and P. 285, Scribner ed.
4. Wm. T. Beauchamp, in "History of Iroquois", P. 163.

the migrating Senecas. This migration would be stopped by the Onondagas who had already made their settlements in Central New York. It is quite possible, however, that these conditions were reversed, and that the Iroquoian people whom Cartier met on the St. Lawrence were Hurons, who were then at war with the New York Iroquois who had already occupied their present seat. The most probable conjecture, however, is that the Senecas, at least, came from the west, and were a branch of the Hurons, (1).

The Country of the Senecas, Nun-da-wa-o-no-ga as they themselves called it, or Sonnontouan as the French called it, comprised the Valley of the Genesee River and the region eastward nearly as far as Cayuga Lake. Before the Neutral War in 1650 some of their villages lay west of the River, but these frontier settlements were withdrawn across the Genesee during that war. On Sanson's map of 1656 their country is located well east of the Genesee. After the war with the Neutrals the Senecas seem to have re-occupied the region west of the Genesee River; villages sprang up along the Niagara River and one, Otinawatawa, as far west as the head of Lake Ontario. These were probably only temporary bases for hunting parties. In the opening years of the 18th century parties of Senecas crossed the divide between the Genesee and the Allegany Rivers and established villages along the headwaters of the Allegany.

Like the other members of the Iroquoian family the Senecas lived in villages composed of "long houses", the largest being "50 or 60 feet long, with 13 or 14 fires in one house". In 1656 their country contained "two large villages and several small ones, besides the Huron village called "St. Michel", (2).

In 1677 and 1678 Wentworth Greenhalgh was sent by Governor Andros to visit the Senecas. He reported as follows: "The Senecques have 4 towns, viz. Canagora, Tiohatton, Canoenda and Keinthe; Canagora and Tiohatton lye within 30 miles of ye lake ffrontenacque, and ye other two ly about four or five miles apiece to ye southward of these, they have abundance of corn; none of their towns are stockadoed", (3).

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1. Bureau Ethnology. Hand-book American Indians, P. 587.
2. Father Le Jeune in Jes. Rel., 1656, Vol. 44, Burrows edition.
3. Journal of a Tour to the Indians of Western New York. Quoted in Doc. Rel. to Col. Hist. of N. Y., Vol. III, P. 251.

In population they exceeded any other of the Five Nations, but did not equal in numbers the Hurons or the Neutrals. In 1660 after the Huron and Neutral wars they were reported to have not more than 1000 fighting men. In 1664 (1) they had "fully 1200 men". In 1677 Greenhalgh reported that they had 1000 warriors, yet in 1730 in a report made to the Governor of New France they were said to have but 350 men (2). In the census of tribes made for Sir William Johnson in 1763 the Senecas were reported to have 1050 warriors.

The Senecas were divided into clans as were the others of the Five Nations. Besides the Bear, Wolf and Turtle clans which were common to all the Iroquois, they had five others, the Beaver, Deer, Snipe, Heron and Hawk clans, (3). Of the fifty chiefs entitled to sit in the Great Council the Senecas were entitled to eight.

In the turmoil of war, politics and diplomacy in which the Iroquois were constantly involved, the Senecas sometimes sided against the French and their allies and sometimes were neutral. Their friendship with the English continued with various lapses until after the Revolution. In the siege of Fort Niagara Sir Wm. Johnson was helped by the Senecas; yet four years later they surprised and destroyed a party of English soldiers on the portage, at Devil's Hole, north of Niagara Falls. They fought with the British during the Revolution.

During all their history the Senecas have been an agricultural people. From the earliest times they were largely dependent upon their crops of corn, beans and squashes for subsistence. They gathered the wild fruits and nuts of the forest; but they planted European fruit trees about their villages at an early date. In the numerous journals of General Sullivan's expedition, mention is made of the orchards of peaches and other fruit which were destroyed by that force. Game abounded in the forests of the wilder portions of their country. Fish they captured with nets, hooks and spears.

Of the life of the Senecas before the advent of traders from Albany, nothing is known. They probably differed in no respect from other Stone Age people of the Iroquoian stock. When they

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1. Jesuit Relations, 1664.

2. Doc. Rel. to the Col. Hist. of N. Y., Vol. IX, P. 1054. A French census.

3. L. H. Morgan, League of the Iroquois, P. 75, Vol. 1, edition 1901.

first became known to the Europeans they began to substitute for their primitive and ineffective belongings the more effective, convenient and beautiful tools, ornaments and weapons introduced by the Dutch traders. Brass kettles gradually supplanted those make of clay, though because of the cheapness of the home-made clay kettles, these seem to have persisted for a long time. Iron axes at once supplanted those of stone, and stone arrow-points were gradually superseded by points of iron which were imported along with guns, powder and bullets. They obtained sheet brass from which they cut their own arrow points and ornaments. Immense quantities of glass and shell beads rapidly came into use. Wampum was eagerly bought. In the half century following the coming of Henry Hudson in 1609, the Senecas changed from a Stone Age people, able to provide for their simple needs from the natural resources about them, to an iron age people, dependent for their every need upon the store at Albany.

In the early occupancy of the Niagara Frontier the Senecas seem to have had no share. They had some scattering villages west of the Genesee River, but these never approached nearer to the Niagara than perhaps fifty miles.

In 1654, the year after the Senecas had conquered the Neutrals, they became embroiled with the Eries. This nation was of Iroquoian stock, numerous and sedentary. They lived on the shores of Lake Erie, south of the Wenrohronons and west of the Senecas. Once more the Senecas met their match. Though unacquainted with firearms, the Eries carried on the war into Sonnontouan, burned Seneca villages and defeated a Seneca war party. Again the Senecas called on their colleagues for aid; and once more the organization of the League saved them. The Eries were defeated and as a nation they ceased to exist.

The Senecas did not occupy the land on both sides of Lake Erie and the Niagara was thus desolated and depopulated for a long time. A few villages sprang up, one at Youngstown (1) as early as 1650, and another, Otinawatawa, at the head of Lake Ontario. It was in this village that LaSalle met Joliet in 1669. After Joncaire had succeeded in establishing a post at Lewiston, a Seneca village grow up there. In 1718 (2) there were ten

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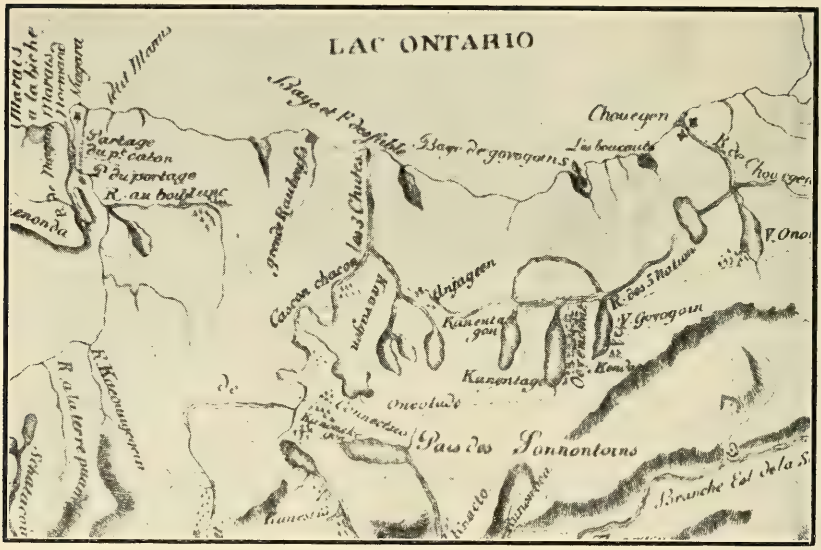
1. L. H. Morgan, League of the Iroquois, P. 97, Vol. 2, Ed. of 1901.

2. Frank H. Severance, "The Story of Joncaire", P. 29, Doc. Rel. to the Col. Hist. of N. Y. Vol. 9, P. 885. Peter A. Porter, Historical Sketch of Niagara, P. 15.

cabins, and when in 1750 Peter Kalm visited the Frontier, he saw there a village of two hundred Senecas, who were employed as porters on the portage road from Lewiston to a point above the Falls.

During the last half of the eighteenth century the Senecas established several villages along the Niagara Frontier. In 1758, Pouchot, who at that time was strengthening Fort Niagara, made a map of the Frontier. On it he marked a village at the bend of a stream which he called the R. au Bois Blanc. This is Tonawanda Creek, and the village occupies the site of, and is perhaps identical with the present Tonawanda Indian village. Guy Johnson, on a map which he made in 1771, located three small villages on the trail between Lewiston and Geneseo. One of these is identical with the Tonawanda village already mentioned. The others can not be identified. One of them may have been the site at Falkirk, and this is most probably true. The other may have been either the fortified site at the head of the Gulf west of Lockport, or the one at Oakfield.



From map in Pouchot's Memoires, (about 1759.) Hough's translation.
Marshall Library, Buffalo Historical Society.

It was not until after 1779 that the Senecas occupied the Niagara Frontier in any large numbers. During the Revolution they had aided the British, and their chiefs and warriors were prominent in the border raids of that period. In 1779, General Sullivan and General Clinton were instructed to direct a punitive expedition against them. During the summer of that year the Colonial forces under these two leaders devastated the whole Seneca country. Villages and scattered hamlets were burned, orchards were cut down, and the growing crops and stored corn were destroyed. That winter the Senecas faced a famine, and for aid they fled to Fort Niagara, then the headquarters of the British forces on the Frontier. Over five thousand camped on the plains about the fort and along the river as far as Lewiston. After a winter of terrible hardships during which hundreds died, a great number of the refugees, rather than return to their desolated homes, selected land along Buffalo Creek and its branches; and there they established new homes.

Most of these exiles were Senecas, but accompanying them were some Onondagas and Cayugas. The main body of Senecas settled between Buffalo Creek and Cazenovia Creek, along what is now Seneca Street and Abbott Road in Buffalo. They grouped themselves for the most part on what is now Indian Church Road. Another party established itself at what is now Gardenville, where a group of cabins grew up, later called "Jack Berry's Town." A small party settled half a mile east of Blossom and another on the "Big Flats" at Elma. A considerable party settled along Buffalo Creek on lots 4, 11, 12, 14 and 15, in Elma township, near East Elma, and just east of this, a mile and a half southwest of Marilla a small settlement was formed, (1).

The Onondagas went up Cazenovia Creek and established themselves on both sides of the Creek at the ford just west of Ebenezer. The Cayugas built a few cabins just north of the Seneca village on what is now William Street, Cheektowaga.

It seems more than a mere coincidence that the Seneca settlements grew up on, or in very close proximity to, ancient village sites. The main body established itself about the ancient site on Buffum Street, Buffalo; while the smaller party at East Elma reoccupied the land cultivated by the people of the three ancient villages at that point. Their cabins stood too, on the old sites on Barnard Street, Buffalo, and on the Eaton Farm and the Hart

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1. For villages at Elma see Warren Jackman's "History of the Town of Elma."

Farm in West Seneca. It is quite within the bounds of possibility that these sites, once the dwelling places of the Wenroes, had never been entirely forgotten or even deserted; and while there was never any permanent occupation of the sites, they may still have been for a century and a half the homes of wandering Seneca parties.

Long and close contact with Europeans had given these exiles many of the comforts and conveniences and also the vices of the white men. They no longer lived in long communal houses. Their cabins were made of logs and in some, the logs were squared. Each cabin was the home of but one family. The long house type persisted, however, in their council houses. They still lived under the old laws of the Iroquois League and were governed by their chiefs. In 1792, 1793 and 1794 Councils of the entire league were held in the Buffalo Creek council house of the Onondagas for the settlement of land disputes. For dress the Senecas of this period wore a modified frontier costume. Leggings and moccasins were still in common use, and a fine blanket took the place of the white man's coat. The costumes of the men and women differed little. Their silversmiths wrought silver into artistic brooches, and their women adorned their garments with intricate and artistic designs in beadwork. Their staple food was still corn and beans, varied by such game as their hunters could find. Some few were Christians but the most still clung to their pagan beliefs. The Buffalo Creek settlement in time had a church and a missionary, and it took from the church its missionary name, "Te-kise-da-ne-yout", "the place of the bell", (1).

The Buffalo Creek group of Senecas persisted for sixty years, until the growing city of Buffalo, on whose borders the villages were, made the land they occupied so valuable that they were forced finally to remove from them. The history of the cession and conveyance of these lands is involved and complicated. Even yet disputes arise between white man and Indian and within five years the Supreme Court of the United States has had before it a case based on such disputes.

Before the Revolution the Six Nations of New York—the League of the Iroquois —claimed a vast and indefinite tract of land lying west of their actual frontiers on the Genesee River. This claim was based upon their conquest of the tract and was never disputed by the English. After the Revolution the colonists con-

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1. L. H. Morgan, "League of Iroquois".

sidered the Six Nations as a conquered nation and dealt with them accordingly. In 1784 by treaty the United States extinguished the Iroquois claim to the western land, by obtaining from them a cession of all lands west and south of a line drawn from a point on Lake Ontario, four miles east of the mouth of the Niagara River, to the mouth of Buffalo Creek, thence southward to the northern boundary line of Pennsylvania, thence, following this boundary line west and south to the Ohio River.

Two years later the conflicting claims of Massachusetts and New York in western New York were compromised, and in 1788 Massachusetts sold the preemption rights of all the land which under the compromise had fallen to it, to two men, Messrs. Phelps and Gorham. Owing to the appreciation of United States money these were unable to make payment in full for the tract, so they retained a portion of it and returned the remainder to Massachusetts. This remaining portion was then bought by Samuel Ogden, as agent for Robert Morris.

In 1794, by a treaty signed at Canandaigua the United States secured to the Senecas all lands west of the Phelps and Gorham tract.

In 1792 and 1793 Robert Morris had conveyed to a party of capitalists whose headquarters were at Amsterdam, Holland, a tract of 3,600,000 acres in western New York. This was known later as the Holland Purchase. To perfect their title to this tract it was necessary to extinguish the title of the Senecas. This was accomplished by the Big Tree treaty in 1797, when they, for a consideration, relinquished to Robert Morris all claim to the land thus conveyed to the Holland Company, reserving, however, ten separate tracts for their own use. Of these ten, two, viz. the Cattaraugus and the Tonawanda Reservations, besides that already occupied on Buffalo Creek, lay on or near the Niagara Frontier. The Buffalo Creek Reservation was about 7½ miles from north to south and eighteen miles from east to west. In it were included the present townships of West Seneca, Elma, Marilla, the southern part of Cheektowaga, Lancaster and Alden, and the northern portion of East Hamburg, Hamburg, Aurora and Wales. The Cattaraugus Reservation at that time lay along the shores of Lake Erie from near Dunkirk about to Angola.

In 1802 the Holland Company obtained most of this from the Senecas, giving them in return for the lake frontage the present Cattaraugus Reservation. The Company reserved the preemption right, however, and in 1810 it conveyed to David Ogden not only this Reservation but also the Buffalo Creek, Tonawanda and Tuscarora Reservations, "subject only to the right of the native Indians and not otherwise". In 1838 an agreement was made between the United States, represented by R. H. Gillett, and the Senecas, whereby they and others of the Six Nations were to remove to lands west of the Missouri River, to be deeded to them by the United States, and they were to convey to Messrs. Ogden and Fellows for a consideration of $20,200 all lands owned by them in New York State. The purchasers promptly began to open these lands to settlers; but the Indians charged irregularities in obtaining the necessary signatures of their sachems and women, and refused to abide by the terms of the deed. So actively did they urge their claims of fraud that a compromise was finally made whereby the Ogden Company released and returned the Allegany and Cattaraugus Reservations; while the Senecas gave up the Buffalo Creek Reservation and the Tonawanda Reservation, allowing preemptive rights to remain in the Ogden Land Company. The Senecas on the Tonawanda Reservation protested vigorously against this compromise and refused to remove, whereupon the United States bought from the Ogden Land Company their interest in the Tonawanda Reservation which is now held in fee by the Comptroller of the State of New York for the Indians living thereon, (1).

After the compromise, at different times between 1842 and 1844 the Indians of the Buffalo Creek Reservation removed to their lands on the Cattaraugus Reservation, where they and their descendants still live. For many years thereafter parties of Senecas came frequently to Buffalo Creek, and even as late as twenty years ago the writer remembers to have seen Seneca tents on the flats of Cazenovia Creek.

The Cattaraugus Reservation lies on both sides of Cattaraugus Creek, in Erie, Cattaraugus and Chautauqua Counties. It contains 21,680 acres. The Tonawanda Reservation lies in Erie, Niagara and Genesee Counties and contains 6,550 acres. The Senecas on the Cattaraugus and Allegany Reservations are incorporated under the name of "The Seneca Nation". They are governed under a constitution by a president and a council of

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1. The data regarding these land changes were obtained from "The Indian Problem", a report made in 1889 to N. Y. Legislature by a special committee to Investigate the Indian Problem of the State of N. Y.

sixteen members, one half of whom are elected to represent the different clans by the women of the clans. In 1890, there were in New York State, 2,680 Senecas, of whom 1,355 lived on the Cattaraugus Reservation and 518 on the Tonawanda Reservation. The majority of the Senecas are "Pagans", that is they are not Christians. In the Cattaraugus Reservation are two villages, one grouped about the churches at Iroquois, the other at the east end of the Reservation. On both reservations the people are mostly farmers, and some fine farms are found there. Much of the land, however, is still wild and wooded. Many of the people work for their white neighbors, on farms or in the canning factories; and some few of the primitive manufactures are still carried on. Baskets are made of strips of elm or ash, and many are very artistically made. Some have become professional actors in various Indian plays. The Indians who sell flowers on the streets of Buffalo are mostly from the Cattaraugus Reservation.

The Tuscaroras. (1).

On the "Mountain Ridge" in the township of Lewiston, overlooking the beautiful Ontario Plain, lies the parcel of land known as the Tuscarora Reservation. On this, supported by their farms, live the thrifty, intelligent and prosperous Sixth Nation of the Iroquois Confederacy, the Tuscaroras.

Their occupancy of the Niagara Frontier is the result of a long series of misfortunes, troubles and wanderings. Some of these are known through history, some only through traditions of the nation.

The tradition of the origin and early wanderings of the Tuscaroras is preserved in the writings of Elias Johnson, a chief of the nation. According to this tradition (2) the six nations, afterward to be the Iroquois Confederacy, was led by Ta-ren-ya-wa-go, Holder of the Heavens, until five of the nations had settled in what is now Central New York. "The sixth and last family went on their journey toward the sun-setting until they touched the bank of the great lake which was named Kanha-gwa-roh-ka

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1. Various names have been given the Tuscaroras. Thos. Jefferson called them "Monacans". Mr. Cusick calls them "Kau-ta-noh" and "Esanrora". Mr. Johnson calls them "On-gwe.hon-wa". Their land was "Dusga-o-weh-o".

2. Elias Johnson, in "The Legends, Traditions and Laws of the Iroquois". P. 44.

(that is, a cape) now Erie, and then went forward between the midday and the sun-setting and travelled a great distance when they came to a large river, which was named O-nah-we-yo-kaz (that is, a principal stream) now the Mississippi''. They wished to cross but could find no better bridge than a grape vine, which stretched across it. This they attempted, and some succeeded in reaching the other bank, but before all had passed over the vine broke. Those of the family on the western bank continued their westward march and never again joined their relatives.

Unable to cross the great river, the main body turned east and south. They were led by Ta-ren-ya-wa-go across the Allegany Mountains into the sunny plains bordering the ocean in what is now North Carolina. There at last on the Neuse River the wanderers stayed.

If Mr. Jefferson (1) is right in identifying the Tuscaroras with the Monacans, the first historical reference to them is by Captain John Smith who mentions them as being enemies of the Indian Powhatan of Virginia.

When the first white man came to Carolina they found the Tuscaroras settled in 6 towns (2) on the Neuse, Pamlico, Taw and Roanoke River. They numbered some 1200 warriors or perhaps 6000 persons.

Encroachments by the white settlers led in 1711 to a war with the Tuscaroras. Without warning of any kind, at dawn September 22, 1711, a party of Tuscaroras, aided by other Indians, fell upon the outlying settlements and massacred a hundred settlers. The massacre was accompanied by horrible barbarities. Women were impaled upon wooden stakes, infants were hung upon trees, and captives were tortured, (3).

Upon receipt of the news of this outrage the governor ordered out the militia of three counties and began a punitive war. After several campains, the main body of Tuscarora warriors fortified themselves in their principal town, No-ho-ro-co. The militia under James Moore surrounded the town, breached the palisades and carried the fort by assault. Col. Moore's report is concise.

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1. Thomas Jefferson – Notes on Virginia.

2. E. Johnson, "The Legends, Traditions and Laws of the Iroquois", P. 61. Horatio Hale, Book or Rites, P. 15, says they had 15 towns.

3. Col. Spottswood to Board of Trade, Oct. 15, 1711, and Major Gale, in a letter dated Charleston, Nov. 2, 1711, in Colonial Records of North Carolina, Vol. 1. Also in same, P. 905, Journal of De Graffenried.

27 March 1713, (1).

Sr.

Ye 20th of this instant I attach No-ho-ro-ca fort on C * * * Creek & ye 23d In ye morning took itt, with ye loss of 22 Whit men and 24 more wond'd-35 Indians killed & 58 won'd — Most of ye Damage wee Reced after wee Gott ye fort to ye Ground, which we did in ye first 3 hours—I have little else to advise yr Honrs but that ye Qu't of ye enemies Destroyed is as follows—Prisoners 392, Scolps 192, out of ye sd: fort—& att least 200 killed and Burnt In ye fort & 166 kill'd & taken out of ye fort on ye Scout, which is all; but My Servis to Capt: Jones, from your Honre obdt Servt

JA: MOORE.

This war and its results split the Tuscaroras into two parties. A small portion, led by "King Tom Blunt" made peace with the colonists, (2). A larger party was dissatisfied with this action and applied through ambassadors for admission to the Iroquois Confederacy. The Iroquois in council heard the ambassadors and after the usual deliberation the Senecas adopted the Tuscarora Nation and thus formally admitted them into the League. The Oneidas granted them a parcel of land lying between the Unadilla and Chenango Rivers, and the council invited the new members to live there. Many of the Tuscaroras accepted the invitation and removed to their new home, arriving there in 1714 or 1715. Not until 1722, however, did they enjoy in full the privileges of membership in the League. In that year their sachems assembled with others of the original Five Nations at a council at Albany. In 1766 certain chiefs of the Tuscaroras so prevailed upon the remnant in Carolina that 160 joined their kindred in New York; but a few remained, and it was not until 1802 that their descendants joined their kin at the village on the Niagara Frontier.

For two generations the Tuscaroras lived in comparative peace on their land on the Unadilla River. Occasional parties of their warriors took part in the constant warfare then going on in the South. In 1736 a French enumerator reported that they had 250 men in a village near the Onondagas.

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1. In Colonial Records of North Carolina, from Calendar of Va. State Papers. Vol. 1, P. 165.
2. Colonial Records of North Carolina, Vol. 1. P. 816, 979.

During the Revolution about half of the Tuscaroras sided with the British against the American Colonists. At that time a Colonel Dalton estimated that 200 Tuscarora warriors served in the war-parties sent out by the British. In 1779 General Sullivan's army devastated their country along the Unadilla River and burned two of their towns, Ingaren and Shawhiangto. The Tuscaroras, once more homeless, fled northward and scattered amongst the other Iroquois. Many continued their flight to Fort Niagara, where during the winter of 1779-80 they formed a small settlement on Four Mile Creek.

The settlement on the Mountain Ridge began the next year. Two families followed the Niagara River up as far as Lewiston and ascended the Ridge. So well were they satisfied with the country on the summit that they wintered there. The next Spring other families followed them and settled near the "Old Saw Mill". The refugees from the old Unadilla settlements joined these and a village grew up, known as "Go-o-no-geh".

When in 1797 the Senecas conveyed to Robert Morris their lands in Western New York, they reserved for themselves ten parcels surrounding their settlements. The settlement at Ga-o-no-geh was overlooked, no reservation was made for the Tuscaroras and once more they found themselves homeless. The Tuscarora chiefs promptly made a formal complaint in council that the Senecas who in the beginning had adopted them, had now abandoned them. The Senecas granted them a square mile on the Mountain Ridge and Robert Morris, who wished to avoid as far as possible any trouble over Indian lands, granted them two square miles adjoining the Seneca tract. Written indentures for these two parcels of land were executed by the chiefs of the Tuscaroras for the nation and these were filed in Lockport in 1810.

One more acquisition completed the present "Tuscarora Reservation". After the Tuscarora war in North Carolina, the colonists made a treaty with that portion of the nation which adhered to "King Tom Blunt" and granted to the Tuscaroras a parcel of land on the Roanoke River. Those of the nation who had gone to New York still claimed a portion of this land and in 1800 they sent two chiefs to see whether money could be raised upon this share. They effected a lease of the entire grant and persuaded the Tuscaroras there resident to join their New York kindred. The money thus raised was applied through the War department to the purchase from the Holland Land Company of 4,329 acres adjoining their former grant. These three parcels of land make up the present Tuscarora Reservation. Hither in 1802 came the portion of the nation whose ancestors nearly a hundred years previously had made peace with the Virginia government.

The Reservation at the present time is the home of about 400 Tuscaroras and a very few Onondagas. On it are two schools and several churches. The people are farmers whose holdings are characterized by an appearance of thrift and prosperity. English is spoken by most, and a number have received college or secondary school training.

The Missisaugas, (1).

The Missisaugas were Algonkins and belonged to the Eagle clan of the Chippewa Nation. According to A. F. Chamberlain (2) their name is an English version of their Chippewa name, "Minzezageeg", meaning "the people who inhabit the country where there are many river mouths". According to Hewitt, it is derived from two Chippewa words, "Misi", meaning "large" and "Sig" or "Sauk" meaning "outlet", (3).

When they first became known to the Europeans they lived on the shores of Lake Huron, east of Sault Ste. Marie. In Father Le Jeune's list of tribes known to him in 1640, they are called "Oumisagai" and are described as living "after the Amikoui upon the same shores of the great lake". In 1670 they still lived on the shores of Lake Huron, for in that year the missionaries joined the mission of the "Mississakiks" to that at Sault Ste. Marie, (4).

Their manner of living at that time as described by the Jesuit missionaries, seems precisely that of the other Algonkins who existed miserably in the wilderness north of the Great Lakes. They had no permanent villages, but wandered at will in pursuit of game or in quest of the wild fruits of the forest.

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1. This spelling is the one used by the Bureau of Ethnology in "Hand-book of American Indians". Several other forms are in use.

2. A. F. Chamberlain, in Journal of American Folk-Lore, Vol. 1, P. 150, quotes Salt.

3. Mr. Hewitt, quoted in Hand-book of American Indians, P. 909.

4. Jesuit Relations, Vol. 57, P. 215, Burrows edition.

They knew nothing of agriculture. They were arrogant, and of the various tribes with whom the missionaries had to do, they were the "proudest in the neighborhood". Polygamy was common amongst them, the number of wives a man might have depending only upon his ability to provide for them. Like all their neighbors, they were licentious; but unlike them they were amenable to religious teaching, and many were converted and baptized.

The exact, or even the approximate date of their first appearance in the Niagara Peninsula is not known. It was probably later than 1670, for in that year they had not removed from their hunting grounds along the North Channel of Lake Huron. They were not mentioned by La Salle or Joliet, or by Fathers Dollier or Casson who passed across the peninsula in 1669. At that time, on the contrary, these visitors found at the head of Lake Ontario, not Missisaugas, but a small Seneca village called Otinawatawa, evidently a base for hunting parties of Iroquois. These had but recently dispossessed the Neutral Nation, the previous occupants of that region, and were busily hunting beaver and other fur-bearing animals then numerous in the depopulated country. Nine years later, however, in 1678, La Salle met a party of their hunters on the lower Niagara and was ferried across by them. In 1721 they certainly occupied the Niagara Peninsula in considerable numbers, for Durrant, (1) writing in regard to the French post at Niagara, speaks of a magazine west of Niagara for the trade with the "Mississague called Roundheads".

Their reasons for leaving Lake Huron are unknown. Probably the mere fact that the Peninsula offered a fine opportunity for hunting and fishing was the primary reason. Possibly they wished to be in close touch with the French traders. They must, of course, have had some agreement with the Iroquois before they occupied territory which was Iroquois by right of conquest. In 1700, at a council of Iroquois and English, Sadeganaktie, an Iroquois sachem recommended that several western tribes, amongst them the Missisaugas, be invited to come and live among the Iroquois, and it is quite possible that business concerning their removal brought the Missisaugas to a council with

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1. Doc. Rel. to the Col. Hist. of N. Y., Vol. V, P. 588.

the Iroquois in 1708 (1). They are alleged to have defeated the Iroquois in 1705 or thereabouts at Fort Frontenac.

The Missisaugas have a tradition regarding their relations with the Iroquois, (2). According to this the Ojibways, from whom they are descended, "conquered" the Iroquois "in 1759", after a war which had lasted a hundred years. The Mohawks who were at that time settled at Cataraqui, escaped and fled to New York, but later received permission from their Ojibway conquerers to return to Canada, and accepted a grant of land between the Shannon and the Napanee Rivers. Here they afterwards settled.

According to another version of the same tradition, (3) the Ojibways defeated the Nottoways (Iroquois) in several skirmishes and in a final battle at Burlington Bay, utterly defeated them. This victory resulted in the expulsion of the Iroquois from the Niagara Peninsula and its occupation by the Missisaugas.

The Iroquois, also, had traditions having to do with the Missisaugas. According to Mr. Cusick's version (4) of these the Twakanhahs (Missisaugas) possessed the bank of the Niagara River a thousand years before Columbus discovered America. Two hundred years later they ceded the country lying between the Kea-nau-hau-sent (Oak Orchard Creek) and the Onyakarra (Niagara River) to the Iroquois. Four hundred years later the "Twakanah began to wage a war against the five nations; the Senecas on the frontier were most engaged in the warfare."

In whatever manner they may have acquired the country, they appear frequently in its history until the middle of the last century. Always migratory, they appear and disappear most unexpectedly. In a French census made in 1736 the enumerator says: (5) "The Missisagues are dispersed along this lake (Ontario) some at Kente, others at the river Toronto, and finally at the head of this lake, to the number of 150 in all, and at Machedash. The principal tribe is that of the Crane". In August, 1745, (6) "65 Mississaguez from the head of Lake On-

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1. Doc. Rel. to the Col. Hist. of N. Y., Vol. IX, P. 815.
2. A. F. Chamberlain, Journal American Folk-Lore, Vol. 1, P. 150.
3. "Peter Jones and the Ojibway Indians", P. 113, quoted in Coynes Historical Sketches of Elgin County, P. 28.
4. Cusick, "Sketches of the Ancient History of the Six Nations", P. 23-29.
5. Doc. Rel. to the Col. Hist. of N. Y., Vol. IX, P. 1054.
6. Doc. Rel. to the Col. Hist. of N. Y., Vol. X, P. 34.

tario" served in the French army against the British in New York; and later in the year seventeen of this party pushed as far as "6 leagues below Orange, struck a blow and brought back 4 scalps", (1).

During the next ten years they seem to have drifted farther north; and at the same time they trausferred their allegiance to the British. At some time between 1745 and 1750 some of the Missisaugas were compelled by the French to cross the Niagara River and settle near the Senecas. In 1746 they were temporarily admitted into the Iroquois League as a seventh nation, (2). In 1755, at the beginning of the last French war, a Cayuga sachem brought before Sir William Johnson, "Nockkie, a great Sachem of a Castle called the Missisagoes" who lived on the north shore of Lake Ontario, and who belonged to the "Chippewye Confederacy", (3). At that time they were allies of the Six Nation. Five years later Sir William expected help from them against the French, (4).

In 1763, after the French war, they seem to have shared the dissatisfaction felt by all the Indians east of the Mississippi River against the methods of the British. They still roved about through the forests of the Niagara Frontier, and at this time one of their bands killed and scalped an English soldier near Niagara, (5). In Sir William's census of Indians, made in 1763, they are called Missisagais or Chippeweighs and are noted therein as having 320 men, and as living near Detroit, (6). Here under Pontiac they took an active part against the British garrison.

Previous to the American Revolution they seem to have lived at the western end of the Niagara Peninsula. On a map made by Guillame de Lisle in 1718, the name occurs on the western bank of the Detroit River. On a map made by Bellin in 1744 and on one by M. le Chev de Beaurain in 1777 (shown on page 276) they are marked as occupying the east bank of the St. Clair River. Not until 1776, on a map in the "American Mili-

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1. Doc. Rel. to the Col. Hist. of N. Y., Vol. X, P. 35.
2. Hand-book of American Indians, Vol. 1, P. 909.
3. Doc. Rel. io tne Col. Hist. of N. Y., Vol. VI, P. 975.
4. Doc. Rel. to the Col. Hist. of N. Y., Vol. VII, P. 626.
5. Doc. Rel. to the Col. Hist. of N. Y., Vol. VII, P. 626.
6. Doc. Rel. to the Col. Hist. of N. Y., Vol. VII, P. 583.

tary Pocket Atlas" does their name appear on the Niagara Frontier, (1).

During the American Revolution they sided with the British. A part of 70 Missisaugas served with Col. St. Leger in the campaign against Albany in 1777. There can be no doubt that of the many war-parties sent out from Fort Niagara during that war, some were made up partly at least of the Missisaugas from the Niagara Frontier.

Their wanderings over the Niagara Peninsula evidently gave the Missisaugas a title to the lands therein, undisputed even by the Iroquois, whose it would appear to have been by right of conquest. In 1748, they ceded the land from the head of Lake Ontario "to the river La Tranche, then down the river until a south course will strike the mouth of Catfish Creek on Lake Erie". Later they and other Indians ceded the land not already ceded west of that grant.

The lands thns ceded they continued to occupy for fifty years. They never lost their roving propensities and their wandering bands are often mentioned by the writers of the period between 1784 and 1820. One of the party which, in 1784, accompanied Governor Simcoe from Navy Hall to Detroit, kept a diary. In it he speaks several times of meeting Chippewas and Chippewa hunting parties, and of seeing their encampments. At one place they "passed a wigwam of Chippewas making maple sugar", (2). The name Chippewa seems to have been applied to them ever since the days of Sir William Johnson. In 1788 Mr. Gould, who later purchased land in Cambria, met parties of Missisaugas on the west bank of the Niagara River. He says of them: (3) "The Massaguea Indians were numerous then in Canada. They had no fixed habitation; migrated from camping ground to camping ground in large parties; their principal camping ground Niagara and Queenston. There were their fishing grounds. Sometimes there would be five or six hundred encamped at Niagara. They were small of stature, gay, lively, filthy, and much addicted to drunkenness."

Their occupation of the Niagara Frontier ended in the opening years of the nineteenth century. At different times between

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1. These maps are in the library of the Buffalo Historical Society.
2. Coyne, Historical Sketches of the County of Elgin, P. 36.
3. Turner, Pioneer History of the Holland Purchase, P. 313.

1829 and 1842 most had removed to reservations granted to them by the Canadian Government. As late as 1850, however, the last deer on Grand Island is said to have been killed by a Missisauga hunter.

At the present time they number about 800 persons. They live on reservations at Alnwick, New Credit, Scugog Lake, Rice Lake and Chemong Lake. Those at New Credit are skillful farmers. Many others are skilled in the manufacture of articles of birch-bark and sweet-grass, which they ornament artistically with primitive designs in beads and porcupine quills.

The Eries.

Our knowledge of the occupation of the Niagara Frontier by the Eries is based upon history and tradition. Excepting possible traders who left no record of their visits, no European seems to have visited their country. What little we know of them came through the Jesuit missionaries, who received their information from their Neutral and Seneca charges.

The Erie nation is first mentioned by Father Ragueneau. In his relation of 1647 he says: (1) "This lake called Erie was formerly inhabited by certain tribes whom we call the Nation of the Cat; they have been compelled to retire far inland to escape their enemies who are farther to the west. These people of the Cat Nation have a number of stationary villages".

By the French, this Erie Nation was called also "Eri", (2) and their country Erie, Rigué and Riqué. With the ending "ronon" meaning "nation" we find it spelled Rhierrhonon, Eriechronon and Errieronon. Cusick calls the nation "Kauneastokaroneah or Erians". The Hurons called them "Yenresh". The Iroquois called them "Otkon", (3).

The Eries belonged to the Huron-Iroquois family and spoke a Huron dialect. They lived like their kindred, in stationary villages. They were harassed by enemies on their western frontier and in the first half of the 17th century they had already abandoned their homes on the shores of Lake Erie and had moved inland. They were brave and warlike, and though they

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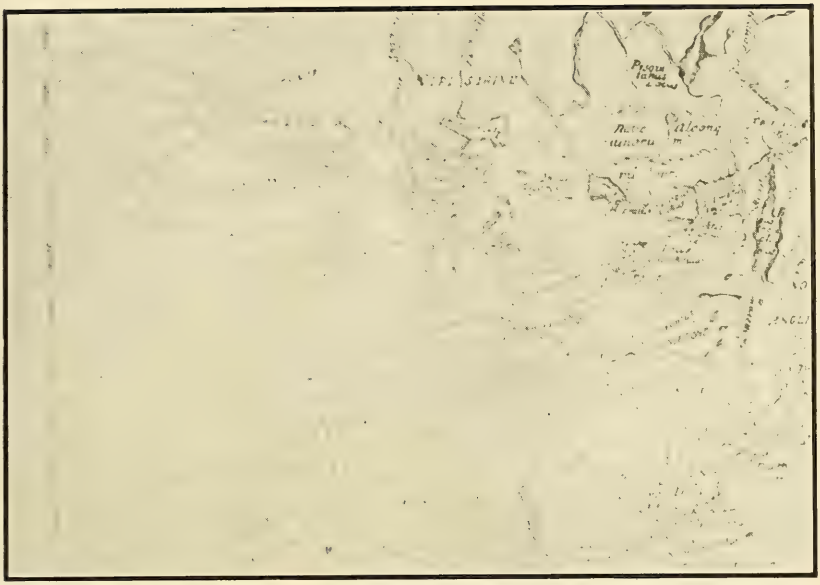
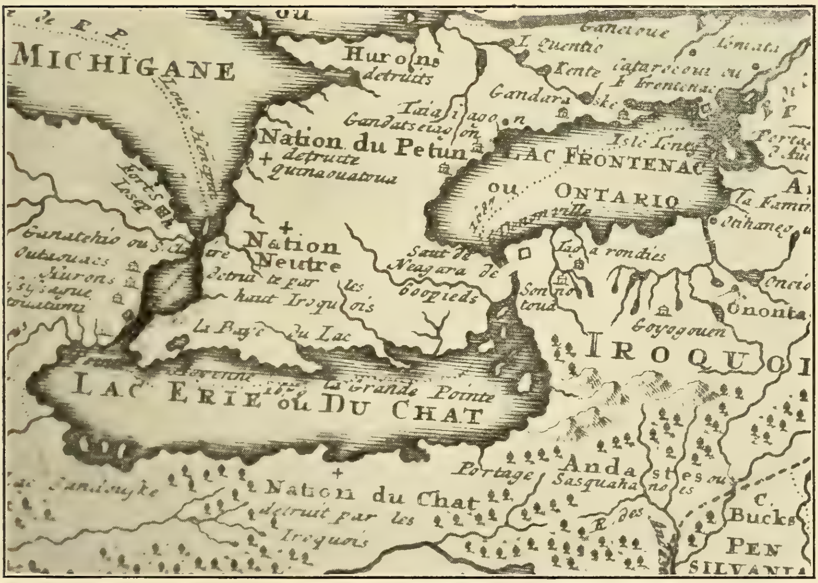
1. Jes. Rels. 1647, Vol. 33, P. 63. Burrows edition.
2. Hand-book of American Indians, P. 430.
3. O. H. Marshall, Manuscript notes, at Buffalo Hist. Soc Library.



From map by Franciscus Creuxius, S. J. Paris 1660.
Marshall Library, Buffalo Historical Society.



From map in Hennepin's Louisianne, Nuremberg, 1687.
Marshall Library. Buffalo Historical Society.

had no fire arms they for some time successfully resisted the Senecas. They were at last vanquished by the Iroquois, and their people killed, scattered or carried captive to the Iroquois towns.

Their manner of living can only be inferred from the remains that they have left. The refuse heaps and graves of a village site once inhabited by the Eries, situated on the shore of Lake Erie throw much light upon their customs.

This village was located upon a bluff on the edge of Lake Erie, in the present town of Ripley, N. Y. It was excavated by Mr. Arthur C. Parker, State Archaeologist, (1). It was palisaded, and had been inhabited for a long time. Its inhabitants were just emerging from the Stone Age, for of the many articles found there, but very few showed the influence of the European trader. Their tools and weapons were made of stone, bone and antler. Their kettles were still of clay of their own manufacture.

In character their artifacts resembled those of the Neutrals and the Senecas. They buried their dead in individual graves, and with the bodies they placed kettles of food, pipes, and the weapons and tools which had belonged to them in life. In all things they resembled the others of the Iroquoian family to the east and north of them.

The war with the Senecas that resulted in the destruction of the Erie Nation began in 1654. Owing to the fact that Jesuit missionaries were at that time established in the villages of the Senecas and others of the Five Nations, a detailed record of that war remains.

The first news of the war reached the Jesuits at Quebec in 1654, (2) when a "fleet of Tobacco Indians" informed them that the Ehriehronnons were arming against the Iroquois. "These we call the Cat Nation because of the prodigious number of wild cats in their country". They further informed them that the Eries had already captured a village of the "Sonnontoehronnon Iroquois" and had set it on fire, and that a party of Eries had pursued a war-party of Senecas which was returning victorious from the direction of "the great lake of the Hurons", had cut off eighty men and had come almost to the gates of the Seneca villages. A celebrated Onondaga chief, Annenraes, whose supposed

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1. Arthur C. Parker, Excavations in an Erie Indian Village and Burial Site, at Ripley, Chautauqua Co., N. Y.

2. Jes. Rel. 1654, Vol. 41, P. 77. Burrows ed.

death in 1647 had indirectly brought about the Neutral War, was captured by the Eries and carried to their country.

The Eries were reported by the Jesuits as being very populous at that time, having been reinforced by Huron refugees. They had no fire-arms but fought bravely with poisoned arrows. They were war-like by nature and proved themselves in the fighting that followed, no mean antagonists. The Senecas appreciated their strength and sent against them a force of no fewer than eighteen hundred men. The other Iroquois evidently became uneasy, for in September of 1655 they asked the French for arms to fight against the Eries.

After the first hostilities which resulted in the defeat of the Seneca war-party and the capture of Annenraes, the Eries thought it possible to make terms. Accordingly thirty ambassadors were sent to the Senecas with instructions to arrange a peace. While these ambassadors were in the Seneca villages, a fight took place between two parties of Eries and Senecas who were hunting at a distance from the country of either. The Senecas were defeated and some of their party were killed. The news of the fight reached the Seneca villages just at the time that the Erie ambassadors were there. The infuriated Senecas at once killed all the ambassadors except five, who escaped and fled to their own country.

The Eries still believed that an amicable settlement could be reached. Their prisoner, Annenraes, was yet in their hands and they thought that by sparing his life, the Senecas could still be appeased. Accordingly it was suggested that, instead of burning him after their custom, a sister of one of the murdered ambassadors should adopt him and thus save his life. She was absent from the village at the time this suggestion was made, but every one took it for granted that to save her nation she would gladly consent. Annenraes was accordingly prepared for the expected adoption. Fine robes were put upon him, and every attention was lavished upon him. During these preparations the bereaved sister returned and to the dismay of the councillors she flatly refused to adopt the prisoner and demanded what was her right, the life of Annenraes. Expostulation was in vain. Nothing could move her. Accordingly his robes were torn off and the fire made ready. A final appeal was made in vain, the fire was set and Annenraes died in the flames. With him died the Erie nation.

When the news of the death of Annenraes reached Sonnontouan, preparations were made at once to avenge it. A strong army pushed westward by the Lake route to the Erie country, They found the entire strength of the Erie warriors behind the palisades of the strongly fortified town of Riqné well armed and eager for battle. After the usual negotiations in which it is said that the Eries were offered a place in the Iroquois Confederacy if they would surrender, the Senecas attacked. Under cover of their canoes which they used as giant shields, they reached the base of the palisades. Then using the braces of the canoes as ladders they swarmed over the wall. The hand to hand fight that followed was one of the fiercest that even the seasoned Seneca veterans had ever participated in. Knee-deep in blood they fought until the last Eries were killed or captured. That night the forests were lit up by a thousand fires at every one of which an Erie burned. The women and children were dragged home to the Seneca villages there to repopulate the country. The Erie nation was no more.

The Kahkwahs.

Our knowledge of the occupation of the Niagara Frontier by a nation called the Kahkwahs is based upon very slight evidence. So slight and indefinite is it, that their identity, though the subject of much controversy, has never been established.

On a map made by Franquelin in 1684 the name "Kakouagoga" is placed at the southeastern extremity of Lake Erie on the second stream falling into the lake. North of the lake the Neuters are named, and the name "Atiraguenrega" another name for the Neuters is marked on the west bank of the Niagara.

On a map made by P. Coronelli in 1688 there is marked at a point east of the foot of Lake Erie, which is here much distorted, the conventional sign for an Indian village or tribe, and the legend, "Kakougaga, Nation destruite". Beneath this is the legend "Nation du Loup". Both of these legends seem to be embraced by the legend, "Les Cinc nation" which extends eastward from the lake. "Atiragenrega" a name for the Neuters is placed at the head of Lake Ontario.

On a map made by the same man the next year, 1689, the legend "Kakouagoga, Nation destruite" occurs at the same place, but Nation du Loup is omitted.

On another map made in the same year, 1689, Coronelli marks the legend "Kakougoga des Iroquois". On this map it is placed halfway between Lake Erie and "Sonnontouan". On all three maps the legend "Les Cinc Nations" is so placed south of Lake Erie that it seems to have been intended to include both "Kakouagoga" and "Nation du Loup".

The Seneca name for Eighteen Mile Creek, a stream emptying into Lake Erie about eighteen miles west of Buffalo, was "Cah-gwah-geh", (1) meaning "where the Gah-gwehs live". In a treaty, dated 1797 this creek was called "Koghquaga" (2) and a later treaty in 1802 it was written Kogh-quaw-ga.

The name "Kah-kwah" is a Seneca word meaning "eye swelled like a cat". There seems to be sufficient ground for saying that the name was applied to a nation by the Senecas, and that this people whoever they were, lived along Lake Erie, near Eighteen Mile Creek. Coronelli, who never visited America must have obtained his knowledge from some one who had received it from Senecas.

Who the people were we can only conjecture.

Mr. Schoolcraft thinks that they were Eries, (3). Later, however, he contradicted himself, for he says elsewhere "Kahkwahs, a people who are generally, but erroneously supposed to be the same as the Eries", (3). Mr. Parkman says that they were the Neutrals, (4). Marshall thinks (5) they were Neutrals. Mr. Henderson thinks it quite probable that the name was applied to both Neutrals and Eries (6).

Mr. Morgan suggests (7) that "the Gah-kwahs or Eries" are supposen to have been a subdivision of the Senecas.

A study of the maps throws little light upon the question of the identity of these Kah-kwahs. The occurrence of the name "Kakouagoga" on a map made in 1684 is peculiar if these people were either Neutrals or Eries. Both these nations were located on the maps of Sanson in 1656 and of Creuxius in 1660; but neither of these locates the nation "Kakouagoga". Franquelin

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1. L. H. Morgan, League of the Iroquois, map.
2. J. G. Henderson, quoted in Note 11, page 313, Vol. 21, Jes. Rel. Burrows ed.
3. H. R. Schoolcraft, Notes on the Iroquois, P. 176 and P. 214.
4. Parkman, The Jesuits in North America, Note, P. XLVI.
5. O. H. Marshall, Niagara Frontier, Note, P. 6.
6. Jesuit Rel. Vol. 21, P. 313, Note 11, Burrows ed.
7. L. H. Morgan, Indian Miscellany, P. 227.

noted it in 1684, thirty-two years after the Neutrals were destroyed and twenty-eight years after the Eries were destroyed. He must have received this name through the Senecas, for it is a Seneca word. He does not state that the nation had been destroyed, but neither does he say that the Neuters were destroyed. His mention of the Neutrals makes it seem entirely probably that he, at any rate, did not consider them to be Neutrals.

Coronelli's maps are interesting. He marks "Kakouagoga" "destruite". He places the legend well to southeast of the foot of Lake Erie, and adds the interesting information, "Nation du Loup". That this applies to "Kakouagaga" seems possible, for he has made for the "Nation du Loup" no conventional village sign, such as he makes for other nations. Under the name "Atiragenrega", he locates the Neuters in the Niagara Peninsula, but does not locate the Eries; so, evidently, he does not mean the Neuters by "Kakouagoga". The "Nation du Loup" is of interest; The "Loups" or "Wolves" were the Munsees, a branch of the Delawares, a nation subject to the Iroquois. It may be only a coincidence that a village of captive Delawares existed on Cattaraugus Creek, as late at least as 1804, (1).

In his later map of 1689, Coronelli does not mention "Nation du Loup", but retains "Kakouagoga". In one map of 1689 he places below the legend "Kakouagoga" the words "des Iroquois.

The name for Lake Erie, "Terocharontiong" is taken from a map by an unknown hand made in 1673.

The maps really establish a few facts, namely, that on the second large stream south of the foot of Lake Erie was a nation or village "Kakouagoga" which had been destroyed, and which was not Neutral. The stream was probably Cattaraugus Creek. The name was in all probability applied by the Senecas to the Erie village or villages on Cattaraugus Creek, (2). Eighteen Mile Creek was probably the eastern frontier of these Eries, and the Seneca name can easily be attributed to the fact that any travelling Seneca party, headed west, leaving the main trail at Buffalo Creek, and following the natural thoroughfare along the shore of Lake Erie would enter Erie territory at that creek.

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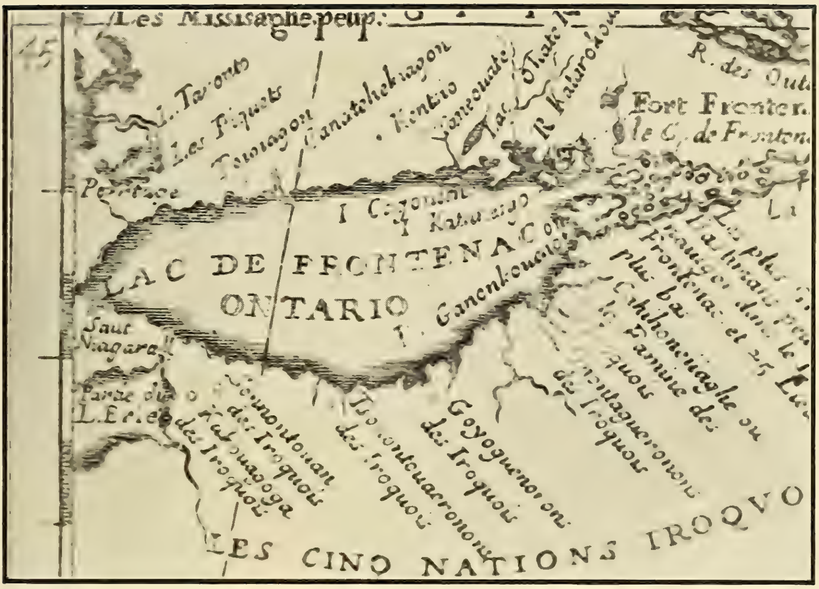
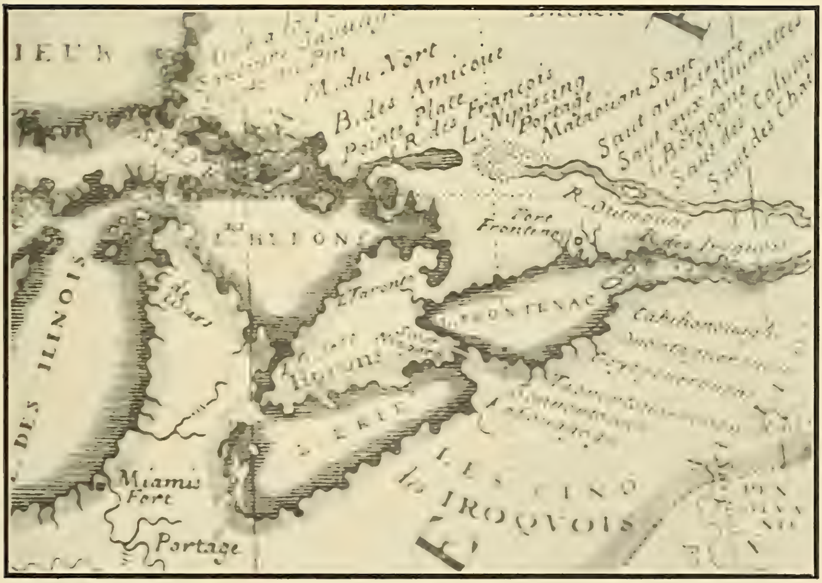
1. Ellicott's Map, Part of Buf. Creek Res.
2. Sites Nos. 1 & 2 in Brant.



From map by le P. Coronelli, Paris, 1689.
Marshall Library, Buffalo Historical Society.



From map by le P. Coronelli, Paris, 1689.
Marshall Library, Buffalo Historical Society.

Archaeology of the Niagara Frontier.

The antiquities of the Niagara Frontier comprise the sites occupied by villages, and their attendant burial places; camp sites; quarries and factories; earth-works; imperishable artifacts; and the bones of the primitive inhabitants.

Village Sites.

The word "village" when used here, means any Indian community established at one place for a reasonable length of time. It applies to any collection of homes of a settled people.

Large village sites occur on both sides of the Niagara River and from the "Mountain Ridge" to Cattaraugus Creek. They occur in four groups, viz: (a) at Cattaraugus Creek; (b) at Buffalo Creek; (c) at the "Mountain Ridge;" (d) on the Niagara River.

Every site is situated on a water-course. The Indians had no knowledge of wells, and relied for a supply of water, upon running streams. Nearness to a stream was therefore a prime necessity. Some of the streams were sufficiently large to be navigable for canoes and so gave access to distant sources of food supply. The larger streams gave a limited supply of food, and even the brooks upon which some of the villages were situated supplied small fish and clams.

Many of the sites were selected because they could easily be defended. Nearly every site occupies a commanding position. Some are on the "Mountain Ridge" overlooking the broad Ontario plains; others are on bluffs or high terraces of the streams.

Nearly all the villages stood on dry, well-drained ground. In some few cases the soil is wet and clayey, but this disadvantage was seemingly overbalanced by some special advantage, as nearness to an abundant food supply, or natural strength of position.

As a large village means a settled people, so also does it mean an agricultural population. It is therefore to be expected that every village be situated in the midst of fertile land suitable for the raising of corn. Every village was so situated. Along the Cattaraugus and Buffalo Creeks they stood on the highest terraces overlooking the fertile "flats", and on the "Mountain Ridge" they overlooked the rich plains at its foot.

Village sites are marked by the evidences of a long continued occupancy. Every village site has refuse heaps upon it and nearly every one is accompanied by its burial place. The soil is filled with carbonaceous material, charcoal, decomposed food materials, refuse, ashes and artifacts dropped or discarded by the occupants of the village.

Every village site is characterized by black spots in the soil, the remains of the decomposed garbage and kitchen refuse which were thrown from the houses of the village. These spots are composed of friable, carbonaceous, black earth, mixed with ashes, charcoal and charred food, such as corn, beans and acorns. Scattered through the mass are artifacts of all kinds.

These middens were evidently allowed to accumulate for years at the doors of houses or along the edges of the terraces or bluffs on which the village stood. There they slowly decayed and until the abandonment of the village they would be added to constantly. On some sites even now, after the decay and weathering incident to hundreds of years, these middens are of great extent. One on the site on Buffum street, Buffalo, (No 7 of the list) was thirty feet long, fifteen feet wide and five feet deep.

When a refuse heap is disturbed by the plow it forms the characteristic black spots. Owing to the abundance of carbonaceous matter in the refuse these black spots persist for years; and on sites that have been cultivated for fifty years they may still be traced easily. On these spots are to be found all the artifacts originally in the refuse heap.

On one site occurs a modified form of the refuse heap. This is an ''ash,pit'', a pit three or four feet deep and a yard in diameter, filled with ashes and refuse.

The articles found in a refuse heap give an excellent idea of the life of the villagers. During a long occupation practically every article used in the village would find its way either to the refuse heaps or to graves. In some villages little or nothing was buried with the dead, therefore the refuse heaps of such a village contain nearly every imperishable article used in the village. Many of these articles are, of course, broken; in fact, many were thrown upon the midden because they were broken. A large proportion however, are perfect.

Every village site probably has its burial place near it. The cemeteries of some villages have not as yet been found, and some cemeteries have been found far from any site. When a village burying ground occurs it is always in a soft sandy soil close by.

Burials are of two types. Bodies were buried singly in graves, or they were buried temporarily, or even kept above ground until they were decomposed, after which the bones were gathered and with the bones of others were buried in a great, common grave. This common grave has been called a "bone-pit" or ossuary. Several of these "ossuaries" are reported as having been found on the Niagara Frontier.

Of these two methods the burials attached to the village sites are all of the first type, that is, all bodies exhumed had been buried singly in individual graves. This does not prove that the villagers did not bury their dead in "ossuaries". The individual graves may have been only the temporary resting places of their dead, while they awaited the time for the "Feast of the dead". In the graves of the village at East Hamburg (No. 22 of the list) were found axes, kettles and beads, showing conclusively that these, at any rate, were the permanent resting places of their dead. In the graves of the village on Buffum Street, Buffalo, practically nothing was buried with the bodies, and, for a large village such as it must have been, very few bodies were found. It is barely possible that an ossuary at Clarence, may have been the common grave of the dead from this and neighboring villages.

Village Sites and Burial Places of Erie County, N. Y.

The sites marked with a star (*) were visited and verified in 1907 and 1908 by Dr. R. E. DeCeu and the writer.

ALDEN.

Nothing reported.

AMHERST.

* Site No. 1. A small village site is on the property of Mr. Lehn, on Lot No. 20, on the east side of the Garrison Road where it crosses Ellicott Creek, on the south bank of the creek. Flakes, points and pottery are found.

Reported by Peter Chalmers.

AURORA.

* Site No. 2. A large village site and its accompanying cemetery exist on the property of Mr. Crook, Lot No. 13, on the west side of the Olean road. It has been under cultivation for nearly a hundred years. Artifacts are still abundant. Iron axes in large numbers, glass beads, triangular flint points, clay pipes with bird effigies, strips of brass and clay potsherds have been found. A burying ground is situated on its northern edge.

It is probably an early Seneca site.

This was reported by W. L. Calver and Dr. E. J. Letson, and referred to indefinitely in "Beauchamp's Aboriginal Occupation of N. Y.", P. 64, where it is called "Bead Hill."

BOSTON.

Nothing reported.

BRANT.

Site No. 3. A village site exists on the property of Mr. Jemerson, on Lot No. 9, of the Cattaraugus Reservation, on the south side of the Creek Road, between the creek and the road.

Reported by Mr. Arthur C. Parker and said by him to have been occupied by Eries during historic times.

Site No. 4. This village site is on the property of John Kennedy, on Lot No. 10 of the Reservation on the south side of the Creek Road. It was explored for Harvard-Peabody Museum by Messrs. Parker and Harrington.

It is said by Mr. Parker to have been occupied by Eries in historic times.

Site No. 5. Extensive village site and ossuary. On the north line of Collins Township, between the creek and the road.

Reported by Mr. A. C. Parker.

Site No. 16. A village site and its accompanying burial mound are situated on Lot No. 28 (?) of the Reservation, on the hill north of the Creek Road.

Reported by Mr. A. C. Parker.

Site No. 6. This is on the property of Mr. Larpland, on Lots Nos. 31 and 17 of the Reservation, at the foot of the hill, east of a road running north to Brant Center.

Mr. Parker reports this and says that it was occupied by captive Delawares. Also on "Map of part of the Buffalo Creek Reservation", Ellicott 1804.

Site No. 102. A mound is just north of the Collins line, close to a road which leaves the Creek Road and runs north up the hill. This is probably No. 30, in Beauchamps's Aboriginal Occupation of New York, P. 65.

Site No. 103. Mound, on the land of H. Sundown, near north line of Reservation. Excavated by Dr. A. L. Benedict.

BUFFALO.

* Site No, 7. A large village site is situated on the property of A. D. Strickler, between Buffum Street and Indian Church Road at the City Line.

This is one of the best known sites in Western New York. It was originally surrounded by an earthwork, which was described and plotted by Mr. Squier, P. 51, and Fig. No. 1, Plate No. 9, in his "Aboriginal Monuments of N. Y". It was accompanied by two burial places. One begun by the Senecas at about 1780, was subsequently used by the neighboring whites until 1892 when it was closed to burials and the bodies in it were removed. The other belonged to an earlier people. It was situated on a sandy knoll just east of the village site. It was excavated by the writer. The bodies are now in the possession of the Buffalo Society of Natural Sciences.

It has extensive and numerous refuse heaps. A very large one was excavated by the writer, others by Dr. A. L, Benedict.

On the surface, notched and triangular points, bone awls and beads, and potsherds are abundant. In the refuse heaps, only triangular points have been found. Artifacts of bone, antler and shell, stone celts and clay pipes and potsherds are abundant. No European articles have been found.

In the graves of the early cemetery but two articles have been found, namely two clay vessels. In the graves of the Seneca cemetery some beaded work was found.

The site has been occupied by at least two different peoples. Before 1639 it was a Wenro village. After 1780 a Seneca Village. Certain rude points found on the surface seem to indicate an occupancy antedating the Wenro occupation, but the refuse heaps, early graves and earth-work are unquestionably Wenro. The Seneca village was established here in 1780 by refugees from the Genesee Valley. Their council house stood a mile west, on what is now Seneca Street, near Archer Street. Several notable persons lived in this village, best known of whom were Red Jacket and the captive Mary Jemison, known to history as "the White Woman". Red Jacket lived near Seneca Street where the old brick school house now stands, in the rear of W. J. Eyring's store. A church stood on Indian Church Road (hence the name) and gave to the village the name "Te-kise-da-ne-yont", "the place of the bell", (1). The old Mission House built about 1830 still stands on Buffum Street.

* Site No. 8. This is an extensive village site accompanied by its cemetery. It stands on Fenton Street on property leased (1909) by Mr. Reinhart, on a terrace of Buffalo Creek. Numerous extensive refuse-heaps, and some "ash-pits" occur. The cemetery was situated on the western edge of the village in a sandy knoll. It was removed by contractors who were grading Barnard Street. It was probably not an ossuary, for on its edge which was undisturbed by the workmen, were three bodies in individual graves. About seventy-five bodies were believed to have been unearthed. Some of these were re-interred in the graded street; some were removed and interred in the Potter's Field.

Some of the refuse-heaps have been excavated by D. M. Silver, and an "ash-pit" by Alanson Skinner. The articles collected by Mr. Silver from this site are in the Museum of the Buffalo Historical Society.

In the refuse-heaps and on the surface numerous triangular points are found. with bone articles and many fragments of pottery.

A few stone pipes were found in refuse-heaps. In the "ash-pit" Mr. Skinner found large quantities of animal refuse, mostly fish-bones. A few ungrooved celts have been found on the site.

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(1). L. H. Morgan, The League of the Iroquois, Vol. 2, P. 127, edition of 1901.

In the graves the workmen found a large variety of European articles. These were iron axes, brass kettles, glass beads, and, they claimed, some nails, glass and broken mirrors. With these were flat points, a broken stone mortar, clay pipes, a stone celt and broken clay kettles. An entire clay vessel was found in a grave by a former lessee, but this has not been preserved.

This site was occupied as late as 1840 by a few Senecas, but originally it was probably one site of the Wenro village that occupied site No. 7.

* Site No. 9. A small site existed on Niagara Street at the mouth of Cornelius Creek. Pottery fragments and points are reported to have been found there. It is now partly or wholly obliterated.

Reported by H. U. Williams, M. D.

* Site No. 10. A burial mound is reported to have existed on Armine Street, near Seneca Street. It is now obliterated. It was perhaps a cemetery of the village on Buffum Street, and is probably the mound called "Doh-do-sot" on page 52 of Squier's "Aboriginal Monuments of N. Y."

CHEEKTOWAGA.

Site No. 11. The Cayuga refugees who followed the Senecas in 1780 settled on Cayuga Creek in a scattered village. Their cabins stood on William Street where it crosses Cayuga Creek. Their cemetery is near by.

CLARENCE.

Burial place No. 12. A cemetery existed on Lot No. 8, about threequarters of a mile south of Clarence, on the west side of the Cemetery Road, 100 feet north of the Fillmore Cemetery. It was excavated by Dr. Ernest Wende. It is probably identical with one of the cemeteries or ossuaries mentioned by Squier, page 55, "Aboriginal Monuments of N.Y."

Burial place No. 13. Graves are reported to have been found on Lot No. 6 on property occupied by Mr. A. Wall on the east side of the Cemetery Road, almost opposite the preceding

cemetery. Probably identical with one mentioned by Squier, Page 55, "Aboriginal Monuments of N. Y."
Reported by F. W. Fisher.

Burial place No. 15. A Cemetery was described by Squier, Ab. Mon. N. Y., P. 56, as being "a short distance from this work on a brow of neighboring elevation".

Burial place No. 15. Bone-pit or cemetery, a mile to the eastward of No. 14 was described by Squier, Ab. Mon. N. Y. P. 56.

COLDEN.

Nothing reported.

COLLINS.

Burial Place No. 17, lot No. 57 of Reservation, south side Creek road. Occupied by Asher Hare.
Burial ground of historic Senecas, of about 1800.
Reported by A. C. Parker.

Site No. 18, Lots No. 56 and 57 of Reservation, between Creek road and Creek. Village site yielding pottery.
Reported by A. C. Parker.

Site No. 19, Lot No. 49 of Reservation on grounds of Thomas Indian School, north side Creek road.
Seneca site, with evidences of an earlier occupancy.
Graves occur.

Site No. 20, Lot No. 49 of Reservation, south side Clear Creek, northeast of Thomas Indian School. Occupied by Job King.
Early village site, reported by A. C. Parker.

Site No. 21, Lot No. 44 or No. 50 of Reservation, northeast of Thomas Indian School, on hill.
Early village site. Reported by A. C. Parker.

Site No. 104, A village site is reported by Mr. Parker as being near the Versailles bridge.

CONCORD.

Nothing reported.

EAST HAMBURG.

* Site No. 22. An extensive village site is situated at the junction of Smoke's Creek and a small unnamed branch, on property owned by George Ellis and Charles Diemer, east of Abbott Road and south of Benzinger Road. One of its cemeteries was on the west side of Smoke's Creek, opposite the village and another is on the Abbott Road on the crest of the hill directly west of the village, at the side of the electric railroad.

On the surface of the site triangular points, scrapers, potsherds, clay pipes and articles of bone are abundant, and effigies of the wolf have been found. There are numerous refuse heaps, some of which are still untouched. A large one was excavated by the writer and Chas. S. Little. In it were found articles of bone and antler, clay pipes, one in the shape of a snake, many triangular points and scrapers, much pottery, some scraps of sheet brass and a slender awl made of rolled sheet brass.

The first cemetery was destroyed by contractors who dug out the gravel for ballast. Many clay vessels were found but most were destroyed or lost. Some clay pipes and an iron axe were saved. The second cemetery was partly destroyed by contractors who used the gravel for ballast. Many clay vessels and all the skeletons were destroyed. Four clay kettles, some glass beads, a pipe, some chert flakes, fragments of three iron knives and some brass wire bracelets were saved by the writer.

This was probably the last site occupied by the Wenroes of the Buffalo group of sites.

EDEN.

Nothing reported.

ELMA.

* Site No. 23. A large village is situated on Lot No. 4, on the north side of Buffalo Creek, just west of the Town Line. It is on a high bluff, surrounded on the south by the deep gorge of Buffalo Creek and on the west side by a deep ravine.

There are numerous very large refuse heaps, but its cemetery has not been discovered. Some of the refuse heaps have been excavated by Messrs. Charles and Ernest Simmons, who have preserved the remains found, and who hold a long lease on the site.

In the refuse heaps are found triangular points, potsherds, numerous clay and stone pipes, and bone articles of a large variety. In one midden was found a bone image of a man. In another broken and charred human bones were found, indicating a cannibal feast. A finger ring made of brass wire is the only European article discovered.

This is probably the most recent site of the Wenro village, which was situated at Elma.

* Site No. 24. A large village site is to be found on the high terrace on the property of Mr. Mullin, on Lot No. 7, just east of the Creek Road.

There are numerous refuse heaps, but no cemetery has been discovered. No excavating has been done, but on the surface of the site were found triangular points, stone axes, bone awls and a bone ''dagger'', perforated teeth and a large iron axe, one half the edge of which has been bent back.

This site was found and reported by Charles Simmons.

This was probably one of the sites of the Wenro village which was situated at Elma.

* Site No. 25. A rather large village site exists on the property of Mr. Hopper, on a high bank on the west side of Buffalo Creek, on Lot No. 18.

There are numerous refuse heaps. No cemetery has been found, though graves of Senecas dating from after 1780 are known to exist. A chief named ''Fish Kettle'' or ''Big Kettle'' is buried there.

Triangular points, flint flakes, potsherds and stone axes are found.

Reported by Charles Simmons.

* Site No. 26. A Seneca cemetery is to be found on the property of Mr. Tolsma, on the east side of Buffalo Creek, on Lot No. 11. It dates back to the Seneca occupancy after 1780. Indians have been said to have visited this cemetery within a few years.

Reported by Charles Simmons.

Site No. 27. The "Big Flats" at Elma were occupied by a Seneca village from 1780–1840.

EVANS.

No village reported.

GRAND ISLAND.

Site No. 28. A burial mound was reported by H. L. Reynolds and was explored by him. It is mentioned in Squier's "Aboriginai Monuments of N. Y.", page 62, and is probably identical with one found on Mr. Gullinger's farm on the Ransom Road.

* Site No. 29. A village is to be found on the property of B. C. Rumsey on Lot No. 11, on the edge of East River. On it are refuse heaps which contain potsherds, flakes, bone articles and animal refuse.

* Site No. 30. A village site occurs on the farm occupied by Mr. Van Son, on Lot No. 111, on the edge of West River.

There are some heaps which contain potsherds, flakes and points of the notched type.

On a low knoll a quarter of a mile eastward, on the Van Son farm, was the cemetery of this village. It was excavated in July, 1909, by the writer for the Buffalo Society of Natural Sciences. Fifty-nine skeletons were exhumed, with which were clay and brass kettles, iron axes, knives and awls, brass and stone arrow points, shell beads, gorgets, and real wampum, bone combs, clay pipes, one beautiful carved marble pipe, and a Jesuit brass ring.

The articles are identical with those found at St. David's and farther west in the Niagara Peninsula. They seem to indicate that the village was inhabited by Neuters.

HAMBURG.

No village sites reported.

LANCASTER.

No village sites reported.

MARILLA.

No village sites reported.

NEWSTEAD.

* Site No. 31. On Lot 42, at Falkirk, on the south side of Murder Creek at Fisher's Falls, is a village site which is probably identical with that described and plotted by Squier on page 56, and Plate 11, No. 2, in "Aboriginal Monuments of N.Y." He described it as having been surrounded by an embankment of an oval shape and as having "caches". The earth work has disappeared. On account of a heavy growth of weeds on the site nothing of its surface can now be seen. Several bodies are said to have been found recently in some sandy knolls just west of the site.

* Site No. 32. A village site is reported to have once existed on Lot No. 6 on the south side of the Batavia Road on what was the Vandeventer farm. It is probably identical with that mentioned by Squier, on page 56, "Aboriginal Monuments of N. Y.", as on the "Vandewater" farm.

This site is now occupied by buildings and meadow.

Reported by Mr. Uriah Cummings.

NORTH COLLINS.

No village sites reported.

SARDINIA.

A site is said to be on the farm of William Phillips, Chaffee. This is hearsay only, and has not been verified.

TONAWANDA.

Site No. 33. A village site is reported by Dr. H. U. Williams as having been situated at the mouth of Tonawanda Creek. Pottery has been found there. A burial mound was discovered on White's Island directly opposite this. The mode of burial was distinctly Neutral.

Site No. 100. "Opposite head of Grand Island". Beauchamp, Ab. Occ. N. Y., P. 61.

WALES.

Nothing reported.

WEST SENECA.

* Site No. 34. A large village site is found on the property of Burgess Hart, on Lot No. 272, on the north side of the Potter Road, on the highest terrace of Cazenovia Creek.

The site has been under cultivation for sixty years and the numerous refuse heaps have been scattered. Many articles are still to be found there. Points of both notched and triangular types are abundant. Stone axes are abundant. Potsherds and bone articles are found. Two birdstones were found on this site.

A small burying place was found many years ago and the bodies and articles found have been scattered. Brass kettles and iron axes were found in these graves. An iron axe and the lock of a flint-lock musket were found recently on the surface.

The site was one of those of the Wenro village at Buffalo.

* Site No. 35. A large village site occupies a low bluff on the north bank of Cazenovia Creek on Lots 129 and 199, owned by A. S. Schwab and William Eaton.

On it are many refuse heaps, but no cemetery has been discovered. Some of the refuse heaps have been excavated by D. M. Silver, and by the writer.

Large numbers of articles are still found there. Both triangular and notched points abound, many stone axes and chisels, scrapers and blades, bone awls and clay pipes have been found. A bone fish-hook was found in one of the refuse heaps, and in another was found a bone "dagger". Many of the remains from this site are preserved at the Museum of the Buffalo Society of Natural Sciences.

This is one of the group of sites of the Buffalo Wenro village.

* Site No. 36. Between 1780 and 1840 a few Onondaga cabins stood on the creek terraces on the Potter Road and at the ford of Cazenovia Creek on its east bank. A council house stood near the ford on the bend of Seneca Street (Aurora Road), (1). Some graves, presumably of these Onondagas;

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(1). "Map of part of the Buffalo Creek Reservation, near the City of Buffalo". Joseph Ellicott, 1804.

were found many years ago on the terrace at the corner of the Reiser Road and Potter Road. Silver brooches are said to have been found with the bodies.

Site No. 37. Between 1780 and 1840 a village of Senecas which came to be called "Jack Berry's Town" stood where now is the village of Gardenville.

Village Sites and Burial Places on the Western Bank of the Niagara River.

Sites marked with a star (*) have been visited by the writer.

LINCOLN COUNTY, ONTARIO.

NIAGARA TOWNSHIP.

* Site No. 106. A mound was situated on the land of Dr. Trimble, in the village of Queenston. It has been excavated. The contents were given to a Museum at Niagara Falls.

STAMFORD TOWNSHIP.

*Site No. 107. A burying ground, perhaps an ossuary, was discovered at the "sandpits" on the verge of the "Mountain Ridge", between St. David's and Stamford village.. It was excavated by contractors who were digging out sand, and most of the contents were destroyed or scattered. Some beautiful clay jars were obtained by Dr. A. L. Benedict, and are now in the Museum of the Buffalo Historical Society. Glass beads and other European articles were abundant.

This was undoubtedly a Neuter burying ground. The village of which this was the cemetery has not yet been found. It is probably not far off, on the "Mountain Ridge". There is little doubt that either this site or the site at "Kienuka" (No. 39) is the village of "Ounontisaston" in which Father Joseph de la Roche Dallion stayed in 1626.

Site No. 108. A mound was situated in Victoria Park at Niagara Falls. It was opened and its contents, I believe, are in a museum in Niagara Falls.

WELLAND COUNTY, ONTARIO.

BERTIE TOWNSHIP.

* Site No. 109. A village is situated on the farm of Mr. Thompson near the Third Concession and the Gilmore Road. Refuse heaps occur. It is undoubtedly Neuter.

* Site No. 110. A village is situated on the main road from Fort Erie to Ridgeway, at the corner of the road leading to Rose Hill. On it are several small refuse heaps, in which have been found triangular points, clay pipes and potsherds, bone awls, flint ''saws'', and a finely carved stone pipe. It is undoubtedly a Neuter site.

* Site No. 111. A village was situated on the river bank between the village of Fort Erie and the ruins of old Fort Erie. The beach is one continuous refuse heap, in which occur points, potsherds and a few bone articles. Pipes and stone axes have been found on the terrace above, and a clay jar and a beautiful stone effigy pipe were found there by Dr. A. L. Benedict. This village is on the site of the quarry of chert, and may have been not so much a village as a great, well-established camping place for parties who came there for a supply of chert.

* Site No. 112. A village site and possibly a mound, occupy the point known as ''Snake Hill'', just beyond the ruins of old Fort Erie. This is reported by Dr. H. U. Williams. Several other sites not listed occur at Point Abino, Sherkston and Port Colborne.

Village Sites and Burial Places in Niagara County, N. Y.

The Sites marked with a star (*) have been visited by the writer.

CAMBRIA.

* Burial Place No. 38. Ossuary on the property of Benjamin Gould, Lot 44, Range 8, near Cambria Center. It is located on the edge of the upper plateau of the "Mountain Ridge". Mr. Turner excavated it in 1823 and described it in his book, "The Pioneer History of the Holland Purchase". It was them surrounded by a wall which enclosed about six acres. In the center of the enclosed area, there was a pit filled with human bones, covered with slabs of stone. He claimed that "hundreds" of skeletons were exhumed, together with iron and copper implements, presumably iron axes and brass kettles.

In 1908 great quantities of fragments of human bones were to be seen on the surface. Pottery and a triangular arrow point were found.

Mr. Squier mentions this ossuary in his "Aboriginal Monuments of New York". He estimated that it contained the bones of "several thousand individuals".

Mr. Beauchamp refers to it and says that it is undoubtedly Neutral.

Mr. H. R. Schoolcraft (Notes on the Iroquois, P. 450) mentions this ossuary. He estimated that 4,000 persons were buried there.

HARTLAND.

Nothing reported.

LEWISTON.

Site No. 39. Village site, known as "Kienuka". This is located near the north line of the Tuscarora Reservation, on the farm of Thomas Williams on Lot No. 61 (?), Range No. 8. It lies on the edge of the second (lower) escarpment of the Mountain Ridge, at the point where it is broken by a small brook, a branch of Twelve Mile Creek.

On the site are many refuse heaps which contain potsherds, chert flakes and points, and animal bones. The points are triangular.

One burial place of the village adjoined it on the south. This was excavated by Samuel Thompson. Another was a half mile west. In this were nearly 100 skeletons. Two other ossuaries were just east of this, (1).

Two elliptical mounds, about twenty feet in diameter, and four or five feet high, and other earthworks were mentioned by Mr. Turner (2). These are now visible.

Mr. Turner says that the name "Kienuka" is a Tuscarora word which means "fort with a fine view". Other meanings are given by Mr. Elias Johnson. Mt. Pleasant said that in it, in Revolutionary times stood the Seneca "Refuge House", where dwelt a Seneca woman named "Ge-gah-sa-seh" or "Wild Cat", (3).

Mr. H. R. Schoolcraft described this site and drew a plan of it, (4).

Burial Place No. 40. Burial place in the village of Lewiston. It was situated on the site of the blacksmith shop. It was excavated by Andrew Garlo.

This was probably the burial place of the Seneca village next to be described.

Site No. 41. A village of ten cabins of Seneca Indians existed at Lewiston, on the "first hill" in 1719. The Indians worked as porters on the Niagara portage. Peter Kalm found 200 Senecas in this village in 1750, (5).

Burial Place No. 42. An Indian burial place is said to have been discovered on the site of the Baptist Church in the village of Lewiston.

Burial Place No. 43. A burial place on the property of Philip Johnson, near the north line of the Tuscarora Reservation was situated on the edge of the second (500 feet) escarpment of the "Mountain Ridge". It was excavated by Samuel

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1. Reynolds, Bureau of Ethnology, 1890-91, P. 512.
2. O. Turner, Pioneer History of the Holland Purchase, P. 26.
3. Reynolds, Bureau of Ethnology, 1890-91, P. 512.
4. H. R. Schoolcraft, Notes on the Iroquois, P. 207.
5. P. A. Porter, Historical Sketches of Niagara. P. 15.

Thompson. In the graves were found shell beads, iron axes and brass kettles.

Burial place No. 44. There is said to be a burial place on the edge of the escarpment, at the head of the Indian Hill Road, at the northwest corner of the Tuscarora Reservation.

Reported in 1908 by Ray Powell.

Burial Place No. 45. A burial place is said to be on the "Way" Farm, in Lewiston.

Reported by Ray Powell.

Burial Place No. 46. Graves have been found on the Powell farm in Lewiston village. These are probably the graves of refugees from the Iroquois country, large numbers of whom settled near Lewiston in 1779, and many of whom died during the winter of that year. They probably belong to the village next described.

Site No. 47. In 1787 there was a cluster of Mohawk Indians one mile east of Lewiston village, (2).

LOCKPORT.

No village sites reported.

NEWFANE.

Site No. 48. Site on Lot No. 43, Range No. 7, Tp. No. 16, on shore of Lake Ontario, west of the mouth of Eighteen Mile Creek.

Reported by Dr. Ringueberg.

This may be identical with the next following.

Site No. 49. Mound on the shore of Lake Ontario, near Eighteen Mile Creek.

This was mentioned by Turner (3). It may be identical with the next.

Site No. 50. Mound in Wilson, three-fourths of a mile from the lake. This is mentioned by Beauchamp, Ab. Occupation N. Y., P. 108.

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1. P. A. Porter, Historical Sketches of Niagara, P. 15.
2. J. L. Barton, Reminiscences of Western New York, P. 39.
3. O. Turner, Pioneer History of the Holland Purchase, note, P. 26.

NIAGARA.

* Site No. 51. Site on Cayuga Island, on property occupied by Mr. Rils. Some refuse heaps occur and a few notched points are found.

Reported by Mr. Houghton.

Burial Place No. 52. Burial place on Goat Island. Mentioned without details by Hon. Peter A. Porter in his "Niagara, an Aboriginal Center of Trade".

PENDLETON.

Burial Place No. 53. Burial place said to be on the property of W. C. Briggs, in School District No. 4.

Reported by Miss Lena Aikin.

PORTER.

Site No. 54. During the early years of the American Revolution the country about Fort Niagara was the camping ground of large numbers of Indians, mostly Iroquois. In 1777 there were 2,300 drawing supplies from the fort. In the winter of 1779 the crowds of refugees fleeing from their devastated homes in Central New York increased this number to 5036, (1).

Site No. 55. O-ni-a-ga-ra, a Seneca village, existed at Youngstown as early as 1650, (2).

ROYALTON.

Ossuary at Orangeport.

SOMERSET.

Nothing reported.

WHEATFIELD.

A "Circular mound" on Tonawanda Island", (3).

Burial Place No. 56. An ossuary on "Tonawanda Island", the present White's Island, was described by E. G. Squier, (4).

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1. F. H. Severance, Old Trails on the Niagara Frontier, P. 57.

2. L. H. Morgan, League of the Iroquois, P. 97, Vol. 2, and Col. Doc. Relating to Hist. of N. Y., Vol. 9, P. 885.

3. O. Turner, Pioneer History of the Holland Purchase, P. 34.

4. E. G. Squier, Aboriginal Monuments of New York, P. 67.

"It was originally about 15 feet in height. At the base appeared to have been a circle of stones perhaps 10 feet in diameter, within which were several small heaps of bones, each comprising 3 or 4 skeletons. The bones are of individuals of all ages, and had evidently been deposited after the removal of the flesh. Traces of fire were to be discovered upon the stones. Some chippings of flint and broken arrow points, as also some fragments of deer's horns, which appeared to have been worked into form were found amongst the bones". This is evidently the burial place of the village next following.

Site No. 57. Village site on the point of land where the Tonawanda Creek empties into Niagara River, in North Tonawanda. This is now obliterated.

Reported by Dr. H. U. Williams.

Camp Sites.

All over the Frontier region are localities where, in a limited area, Indian artifacts are found more or less abundantly. Such small sites are on or near water-courses. They are characterized by the occurence on them of flint flakes, points and occasionally stone axes, gorgets and pipes. They differ materially from the village sites. They are smaller in extent and they lack the refuse heaps and their abundant artifacts. In most cases they yield no pottery.

These sites are probably those of Indian camps. They have certainly been occupied by Indians, in many cases for a long time, but not permanently. They were evidently occupied by parties of hunters, fishermen or berry-pickers, and seem so well established that though they were occupied for but a short time during each year, they may have been occupied year after year. They were perhaps the "hamlets" that Father Dallion mentioned as being convenient to the hunting grounds. On them probably stood, not long bark houses, but wigwams of bark, such as may still be seen at any rendezvous of Indians along the Georgian Bay. Such structures would be erected for temporary shelter by a wandering party, abandoned when the party moved on, and perhaps reoccupied later by the same party, or by another.

The fact, that on such sites, unbroken artifacts are found in any number, is proof of their long occupation. A hunting party of a dozen men might reasonably be expected to lose many arrow points and javelins in the chase, but to lose an article in camp would be as uncommon as it would be in a summer camp of tourists. An occasional kettle might break, an occasional javelin be left behind in some hurried departure, even a pipe might be overlooked. The losing of half a hundred articles on such a site, however, means the frequent, or the long occupation of the site.

Camp Sites of Erie County.

The sites marked with a (*) were visited and verified by Dr. R. E. De Ceu and the writer.

ALDEN.

No camps or village sites reported.

AMHERST.

Site No. 58. A site is reported to be on the property of J. Koch, on Cayuga Street, Williamsville. Flint flakes and points are found.

Reported by W. L. Calver.

AURORA.

* Site No. 59. A site is said to have once existed on the property of A. Riley, on Riley Street, east of the Pennsylvania station, This is mentioned by Beauchamp on page 64, ''Aboriginal Occupation of N. Y.'', and is called ''Fort Hill''. No vestiges of occupation can now be found there.

Site No. 60. A site is said to have existed on the north side of Main Street, East Aurora, near the Girdled Road. 1t was reported by W. L. Calver, but he did not know the owner's name. Clay pipes were said to have been found there.

BOSTON.

No camps reported.

BRANT.

* Site No. 61.. Points and stone axes are said to have been found on the property of the U. S. Preserving Co., (on Lot 52), between Big Sister Creek and Delaware Creek.

Reported by Miss Ayer, Angola.

* Site No. 62. A large camp site is situated on the farm of Mr. Barron, Lot No. 41, on Delaware Creek, just east of Brant Center. Many notched and leaf-shaped points, flakes and scrapers are found there.

* Site No. 63. A similar site is on the south side of Delaware Creek, a quarter of a mile southwest of Site No. 2. Notched points have been found there.

Reported by Dr. DeCeu.

* Site No. 64. Many notched points and a few other articles, amongst them a gorget, were found at the mouth of Cattaraugus Creek, between the Lake Road and the Lake.

Site No. 65. A site is reported by Mr. Parker to be on Lot No. 5 of the Reservation, on the south side of the Creek Road. It is mentioned by Beauchamp, on page 64, "Aboriginal Occupation of N. Y.".

BUFFALO.

Camp sites are found on both banks of Buffalo Creek from its mouth to the City Line, and on Cazenovia Creek from its junction with the Buffalo Creek to the City line. Any plowed field whether on the "flats" or on the upper terraces of either stream will show evidences of Indian occupancy.

Site No. 101. "Forest Lawn group", east of Black Rock, embracing eight small sites. Beauchamp, Ab. Occupation of N. Y.. P. 65. Probably on Scajaquada Creek.

EAST HAMBURG.

* Site No. 66. Notched points are found on both sides of the main road south of Dewell's corners, on the Engle and Girnold Farms. One triangular point was found on the Girnold Farm.

CLARENCE.

Site No. 102. Site on Stevens farm, Harris Hill. Points and clay pipes were found.

EDEN.

No camp sites reported.

ELMA.

Defended camps occur at several places in Elma. See the list of earth-works for these.

EVANS.

* Site No. 67. There is a small site on the property of Seymour Bennett, Lot No. 76, on the north bank of Big Sister Creek, east of the Lake Road. Notched points and an unfinished stone axe were found there. A brass kettle is said to have been found there many years ago.

* Site No. 68. Many flakes, and some notched points are to be found on the farm of Mr. Harper, on Lot No. 66, on the south side of Big Sister Creek, east of the Telegraph Road.

Reported by Miss Ayer, Angola.

GRAND ISLAND.

Site No. 99. On the south side of the Love Road near Base Line Road, many points have been found.

HAMBURG.

* Site No. 69. A very interesting camp is situated on the high bluff on the north bank of Eighteen Mile Creek, on the farm of Mr. Donovan (?), Lot No. 50, Range 8, about half a mile east of the Lake Road. Many notched points have been found there. A few other stone tools have been found, amongst them a beautiful chalcedony drill, a stone on which are three pits, and a shale sinker for a fishing line, around which a notch has been sawed.

* Site No. 70. Another very interesting site is found on the lowest terrace of Eighteen Mile Creek, opposite Hampden Brook,

on Lot No. 50, Range No. 7, in the southeastern corner of Hamburg. Different portions of this site show evidence of its occupancy by two different peoples. On one portion a large number of notched points, a few stone celts, and some very large oval "blanks" have been collected. On the other portion are found triangular points and a few potsherds.

Site No. 3. Dr. H. U. Williams reports that there is a site on Lot No. 10, Range No. 8, on the north bank of Eighteen Mile Creek, where the Erie Railway crosses it.

* Site No. 71. Scattered articles are found on both banks of a small, unnamed stream, just east of the Lake Road at Athol Springs. Notched points and the edge of a broken gouge were found there.

Site No. 5. Scattered articles are found ou the south bank of Eighteen Mile Creek, on Lot No. 2, Range No. 7.

Reported by Leslie Lake, Hamburg.

LANCASTER.

Nothing reported.

MARILLA.

Nothing reported.

NEWSTEAD.

No camp sites reported.

NORTH COLLINS.

Nothing reported.

SARDINIA.

Nothing reported.

TONAWANDA.

No camp sites reported.

WALES.

Nothing reported.

WEST SENECA.

* Site No. 72. Large numbers of notched points were found on the site now occupied by the Lackawanna Steel Plant.

* Site No. 73. Notched points and a very fine "beveled" celt were found on Lot No. 22, Range 8, on the north bank of Smoke's Creek, on the site of the present Steel Plant Village. It was at or near this site that Sakayengwaraghdon, a Seneca chief, better known as "Old Smoke" is said to be buried. Smoke's Creek takes its name from him, (1).

* Site No. 74. On lot No. 37, Range No. 8, on the "Pratt" farm, on the north side of the Ridge Road, notched points and net sinkers have been found.

* Site No. 75. A very interesting site occurs on Lot No. 348, Range 7, south of the Ridge Road, at the southeast corner of the Holy Cross Cemetery. Many notched points, drills, a few stone celts, a gorget and a few potsherds have been found.

On almost any of the terraces of Cazenovia Creek and of Smoke's Creek points and flakes can be found. On a terrace of Smoke's Creek east of the Abbott Road a broken spear point of white quartz was found. On a terrace of the south branch of this creek at Windom a very large flake of chalcedony was picked up.

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1. "Map of part of the Buffalo Creek Reservation near the City of Buffalo". Joseph Ellicott, 1804.

Camp Sites in Niagara County, N. Y.

CAMBRIA.

Site No. 76. Camp site at North Ridge, on the property of Mr. Barnes, on Lot No. 8, Range No. 8, on Twelve Mile Creek.

Arrow points and stone axes have been found. A copper axe was reported to have been found and sent to the Smithsonian Institute, which disclaims all knowledge of it.

Reported by Miss Myra Barnes.

HARTLAND.

* Site No. 77. Camp site on property occupied by J. H. Mayne, on the Quaker Road, Lot No. 11, Range No. 6.

Notched points are said to be found here frequently.

Reported by Miss Jeannette Ingersoll.

LEWISTON.

No camp sites reported.

LOCKPORT,

* Site No. 78. A camp site is reported on a hill on the property of Mr. Beasoner, on Lot No. 8, Range No. 6, Tp. No. 14, a mile and a half southeast of Wright's Corners, on the Slayton Settlement Road.

Notched points are found here.

Reported by Dr. Ringueberg.

* Site No. 79. A camp site is located on the farm of Mr. A. Johnson, Lot No. 77, Range No 7, Tp. No. 14, on the banks of Eighteen Mile Creek.

Many notched points and a few fragments of pottery have been found here.

Reported by Dr. Ringueberg.

* Site No. 80. A camp site is on the farm of Asa Baldwin, on the west branch of Eighteen Mile Creek, half a mile south of preceding site.

Many notched points and some drills are found.

Site No. 105 A camp site is reported on the farm of Mr. Clark (?) on the Warren's Corners Road where it bends at a small brook.

Many notched points are said to have been found here.

Reported by Miss Elizabeth Wayman.

* Site No. 81. Camp site on the property of Mr. Lewis, on Locust Street near Willow Street.

Slate ornaments and a slate pipe were found here by Dr. Ringueberg who reported the site.

NEWFANE.

No camps reported.

NIAGARA.

No camps reported.

PENDLETON.

* Site No. 82. Camp site on the property of Mr. Denniston, on Tonawanda Creek, half a mile west of Pickard's Bridge, Lot No. 42, Range No. 7, Tp. No. 13.

Notched points and stone axes are found here.

PORTER.

No camp sites reported.

ROYALTON.

Nothing reported.

SOMERSET.

Nothing reported.

WHEATFIELD.

No camps reported.

Camp Sites on the Western Bank of the Niagara River.

Sites marked with a star (*) were visited by the writer.

LINCOLN COUNTY, ONTARIO.

NIAGARA TOWNSHIP.

* Site No. 113. Notched points are plentiful on the Burns estate town of Niagara, on Center Street.

* Site No. 114. Notched points and ungrooved stone axes are abundant on the farm of Mr. McFarland, a mile south of Fort George. A large collection of fine points from this site is owned by Messrs. James and Gordon McFarland, Niagara-on-the-Lake.

WILLOUGHBY TOWNSHIP.

* Site No. 115. Sites are reported to be on Navy Island. This island was a favorite stopping place for war-parties of Indians on their way from the far west to join the French at Niagara.

* Site No. 116. A site is reported at the junction of Black Creek and Niagara River, on the property leased by Mr. Beam.

STAMFORD TOWNSHIP.

Site No. 117. A group of sites is reported to be at the head of the Whirlpool, near Bowman's Creek.

Earth-Works.

Earth-works are reported to have been found in the early days in Erie and Niagara Counties and on the Canadian side of the Niagara River but no earth-work of any kind exists to day. They were of two types, namely, defensive works and burial mounds.

The earth-works of the defensive type seem to have formed the bases of palisades which once defended Indian villages or camps. It is probable that all or many of the large villages were thus defended. There is historic evidence that the villages of the Iroquois, the Eries and the Hurons were palisaded, and it can be safely said that the villages in this region were similarly defended.

A palisade was made of the trunks of trees cut into suitable lengths and set upright in the ground. To support these logs and to hold them more firmly in place, dirt was piled about their bases. The earth thus thrown up formed a ridge coincident with the palisade. When, because of the abandonment or destruction of the village, the palisade was burned, or slowly decomposed, the ridge remained. This constituted an earth-work of the defensive type.

The best known examples of this type of earth-work on the Niagara Frontier were found at the site on Buffum Street, Buffalo, (No. 7, Buffalo), and on the site of "Kienuka", (No. 39, Lewiston).

At Falkirk, in Erie County, and a few miles to the west, on the Vandeventer Farm, (No. 1 and No. 2, Newstead), were two others which may have surrounded small villages.

Two other groups occurred in Erie County, one in the town of Elma, the other in Clarence. Both were plotted and described by Mr. Squier. (See list following). These do not seem to have defended villages. The sites enclosed by them have no marks of long occupancy. No refuse heaps can be seen. Some few articles have been found on them, but no pottery.

They seem to have been fortified camps, or the temporary tarrying places of large groups of people in migration.

List of Earth-Works.

AURORA.

No. 83. An embankment crowned a sand hill on the east side of the Girdled Road, near the north line of Aurora Township. This hill has been removed by contractors, and the work is obliterated.

Reported by Dr. H. U. Williams.

This is probably identical with a work mentioned by Mr. Beauchamp, Aboriginal Occupation of New York, P. 64, referring to Wright, P. 283 and Johnson, 124.

BOSTON.

No. 84. An earth-work is said to exist near Boston Centre. It is probably a natural formation.

Reported by F. A. Clark, of Springville. It is mentioned by Mr. Johnson, P. 121, who is quoted by Mr. Beauchamp, in Ab. Occ. N. Y., P. 64.

BUFFALO.

No. 85. An earth-work encircled the site on Buffum Street. All traces of this are now obliterated. It was described by E. G. Squier, in "Aboriginal Monuments of New York", pages 51 and 52, Plate 9, No. 1.

CLARENCE.

No. 86. Earth-work described by Squier, Ab. Mon. N. Y., P. 55, as being 2½ miles south of Clarence. Plate 10, No. 2.

No. 87. Earth-work described by Squier, Ab Mon. N. Y., P. 55, as being 1 mile north of No. 12.

No. 88. Earth-work described by Squier, Ab. Mon. N. Y., P. 55, as being 2 miles from No. 86, on brow of terrace.

No. 89. Earth-work described by Squier, Ab. Mon, N. Y., P. 55, as being 1 mile beyond No. 5, figured on Plate 11, No, 1.

ELMA.

No. 90. An earth-work existed on Lot No. 29, on the farm occupied by Mr. Stitz, at the northwest corner of the Bullis Road, and the Girdled Road.

This is probably identical with that described by Mr. Squier, "Aboriginal Monuments of New York", page 54.

This is now obliterated and there are few traces of occupancy.

No. 91. An earth-work is reported to have been on Lot No. 2, on the Clinton Road, at the corner of the Town Line Road, on a farm occupied by Mr. Johnson.

This is probably identical with that mentioned by Mr. Squier, "Aboriginal Monuments of New York", page 53 and Plate IX, No. 2.

No. 92. An earth-work is reported as having once existed on Lot No. 6, on the east side of Little Buffalo Creek, west of the Town Line Road, on the farm occupied by Mr. Phillips (?). This is probably identical with that described by Mr. Squier, in "Aboriginal Monuments of New York" page 53, and figured on Plate IX, No. 3. He locates it in the township of Lancaster. It is now obliterated.

No. 93. A work is mentioned by Mr. Squier as being on the south side of Little Buffalo Creek, opposite No. 3, of Plate IX.

No. 94. A work was described by Mr. Squier, "Aboriginal Monuments of New York", page 54, and Plate X, No. 1. This was on the south bank of Little Buffalo Creek, but its location is unknown.

No. 95. An oval earth-work existed at the brink of Fisher's Falls, on the south bank of Murder Creek. This is now obliterated. It was described by Mr. Squier, "Aboriginal Monuments of New York", page 56, and figured on Plate XI, No. 2. Graves have been found in the sand hills immediately west of the site. This was probably a Seneca village, one of those noted by Johnson in his map, drawn in 1771.

No. 96. An earth-work was said by Uriah Cummings to have once existed on Lot No. 6, on the south side of the Batavia

Road where it makes a turn, (on the "Vandeventer" Farm). This was probably identical with that described by Mr. Squier, in Ab. Mon. N. Y., page 56, as being on the "Vandewater Farm".

LEWISTON, NIAGARA COUNTY.

No. 97. Defensive earth-works existed on the site known as "Kienuka", on the Williams Farm, in the northeastern corner of the Tuscarora Reservation.

Described by Mr. Turner, in his "History of the Holland Purchase", and by H. R. Schoolcraft.

All traces of earth-work are obliterated.

LOCKPORT.

No. 98. An earth-work was said to exist at the head of the "Gulf" about a mile west of Lockport, on the "Sharp" farm. It is described by Mr. Turner in his "History of the Holland Purchase", P. 29. Careful search for any traces of it has failed to locate it. A natural embankment, a terrace of a small brook flowing into the "Gulf" may be the embankment described. No Indian remains of any kind are found near it, and no one in the vicinity knows anything of it, excepting through Turner's description. See Reynolds, Bureau of Ethnology, 1890-91, P. 512.

Quarries and Factories.

There were aboriginal quarries at a few points along the Niagara Frontier. One certainly existed at the head of the Niagara River at Fort Erie, and others are reported at Williamsville and on Main Street, Buffalo, at the City Line. Nothing remains at any of these points except the debris incident to the work of quarrying.

The one thing sought in the quarries was chert. To the Indians of this region this stone was a necessity. Of it they made their knife and hoe-blades; with it they armed their arrows and javelins.

The chert used by the Indians of the Frontier was obtained mainly from the outcrop of Onondaga rock at the head of the Niagara River. This contained nodules and layers of a fine, black, or dark-gray chert, which fractured with the true conchoidal fracture, flaked well into keen-edged fragments, and was usually free from such flaws as, under the chipping hammer or in use, were apt to cause breaks at unexpected places.

In the drumlins and moraines of Western New York great numbers of chert nodules are to be found, some in their limestone matrix, some free from it. This does not seem to be the same chert as that at Fort Erie. It is apt to be grayer or browner, more brittle, and harder to work.

Besides these two main sources of supply the Indians probably made use of the nodules found in the stream beds and in the outcrops at the "Ledge" and the "Mountain Ridge".

The outcrop of silicious limestone at Fort Erie is nearly horizontal and at the level of the river. At many points it is now covered by blown sand; and for a century stone has been quarried from it for building purposes. Yet the shore at Fort Erie on this outcrop is strewn with chips, flakes, blocks and half-formed implements, the waste of aboriginal quarrying and manufacture. Modern quarrying operations have destroyed all vestiges of aboriginal quarries, yet there can be no doubt that chert was obtained here, not only by the local Indians, but by more distant nations.

Though the great outcrop at Fort Erie was quarried for the indispensable chert, the sources of supply on the drumlins and moraines were not neglected. On every glacial hill may be found the traces of some Indian's successful search for chert. The surface of many hills is littered with chert debris, flakes, chips and implements broken under the hammer. Broken chert nodules from the till were found in the refuse heaps of the Buffum Street site.

Though it was probable that some of the chert taken from the quarry at Fort Erie was worked up into implements on the spot, it is certain that much of it was taken away either unworked or only partly worked. A family coming to the outcrop for a season's supply of chert would not work it up into implements, for they could not know just what they would need for the season. On the other hand they would hesitate to carry away a supply of rough blocks which would be heavy to carry and which might prove useless because of hidden flaws. The natural thing to do was to break from the blocks flakes large enough for any implement, and, further, to work these into a form from which they could later make any needed implement. That this was done is made evident by the frequent occurrence in the refuse heaps of heavy, unworked flakes, and of roughly worked ovals. These flakes and oval "blanks" are too rough and heavy for use, but from them any implement could have been made. "Caches" of such oval "blanks" are sometimes found near village sites. These were brought from the quarry and buried in the earth against some future need.

Excepting at the quarry at Fort Erie, there is no place along the Niagara Frontier which can properly be called a factory; that is a place where chert points or any other articles were made for sale. The most frequent signs of Indian occupancy are the flakes or chips of chert which were dropped on the ground where some Indian made a chert implement. As might be expected these are most abundant on the village sites, and they constitute a large proportion of the material found in refuse heaps. These chips are abundant on every camp site also. Yet there is no place in which they occur so abundantly as to warrant one in saying that there was a factory. The chips in a refuse heap were thrown there by some one of the inhabitants of the house to which that refuse heap belonged, and were the waste from tool making in the house. The chips on the camp sites were dropped there by some one of a wandering party who needed a new point, and made it on the spot.

The Artifacts Found in the Region.

The tools, implements, weapons, utensils and ornaments which were made and used by the Indians of the Niagara Frontier are remarkable for their abundance, their variety and their excellence. Their abundance is due partly to the large population of the region, partly, also, to the existence of ash beds and refuse heaps and graves, in which they have been preserved. Mainly because of these agencies, articles which because of their fragility would ordinarily be quickly decayed or destroyed, are comparatively abundant, and they illustrate the large variety of materials which the Indians used in their manufactures. Ornaments of fragile shell, frail clay kettles, needle-pointed bone awls and fish-hooks, and thin hoe blades made of spongy antler, all owe their present existence to the protection afforded them by graves, or to the preservative nature of the refuse-heaps. That they are to be found in the graves and refuse-heaps at all is the result of the burial customs and household usages of the aborigines.

The workmanship shown on the artifacts is usually excellent. Compared with similar articles from other parts of the United States they evince a skill and dexterity on the part of their makers, not excelled by any.

The skill of the ancient craftsmen was perhaps made possible or enhanced by the excellence and abundance of the materials from which he could choose. In keenness of edge, in neatness of finish, and ease in working, the local chert is far superior to the tough, stubborn, blunt-edged quartzites, rhyolites and argillites of the east coast. For many purposes the bones, teeth and horns of the animals which were abundant here, afforded materials that repaid skillful treatment. The local clays, also, were excellently adapted to the uses of the primitive potter.

Owing to the existence of refuse-heaps, the methods of manufacture of nearly every artifact can be easily demonstrated, for in the refuse may occur, not only the implement itself, but similar implements in an unfinished state, the raw material from which it was made and the debris attending its manufacture.

The artifacts found in the region may be referred to two great classes. To the first class belong all those articles which the Indians obtained from Europeans, or which show traces of European influence, though of primitive manufacture. The second class includes all those articles which were made by the Indians themselves, uninfluenced by Europeans. To this second class the term "primitive" will be applied in this monograph. The two classes of articles may exist together on the same site, even in the same grave; and it is certain that even after the Indians had become practically dependent upon the white traders, they still made and used many of their primitive Stone Age artifacts.

Articles Obtained From Europeans or Showing European Influence.

European articles are found, for the most part, in graves. Occasionally a few articles are unearthed in refuse-heaps, as at Site No. 22 at East Hamburg, or on the surface or in caches, as at Site No. 2, East Aurora. Most of the European articles come from the graves of a few of the villages. During the very early historic time when these villages were inhabited, European articles were the most precious belongings of a bereaved family, and they were consequently buried with the dead.

In the refuse-heaps of Site No. 22, East Hamburg, were found a few pieces of sheet brass, the debris of some manufacture; a brass awl made of tightly rolled sheet brass; a few pieces of sheet brass rolled into the form of truncated cones, perforated for suspension; a few pieces of iron, broken from an iron axe; and a musket bullet. In the refuse-heaps of Site No. 23, East Elma, a brass wire ring was found. On Site No. 24, East Elma, a very heavy iron axe was picked up on the surface. The edge of this is interesting, for a portion of it is doubled back, as though from the effects of some tremendous blow on a rock.

Another iron axe was found on Site No. 34, West Seneca, and a lock of a flint-lock musket was found near-by.

On Site No. 2, East Aurora, a cache of nine iron axes was discovered, and others have been plowed up from time to time.

From the great Neutral burial places on the "Mountain Ridge", at St. David's (Site No. 107), at Kienuka (Site No. 39, Lewiston) and at Cambria, (Site No. 38), large quantities of European articles have been taken. Many of these articles have been lost, but enough remain in the hands of collectors to show that in the graves of the St. David site were glass beads, iron axes and brass kettles, together with such shell pendants and discoidal beads as were of primitive manufacture, In the ossuary at Cambria (Site No. 38), brass kettles and iron axes were found with the bodies, together with triangular chert points.

Of the 59 bodies found in the Neutral cemetery on the Van Son farm, Grand Island (Site No. 30) 18 were accompanied by European articles. Two brass kettles and two iron axes of the French type were found. Iron knives and iron awls accompanied

8 bodies. Glass beads and shell wampum which was probably brought in by traders, were abundant. In one grave was a brass ring such as the Jesuits gave to their pupils and a hawk's bill. Ten brass arrow points and two triangular stone points, evidently the heads of a quiver full of arrows, were found with a skeleton.

On some of the Wenro burial places of the Buffalo Creek group, European articles have been found. With the bodies which were taken from Site No. 8, Buffalo, were iron axes, glass beads, brass kettles, and it is said, some nails, and small mirrors. With these were clay pipes, chert points, and, possibly, stone axes. Nearly all the articles found in this burial place were destroyed, lost or scattered by the workmen who found them.

From burial place on Site No. 34, West Seneca, which was plowed up many years ago, brass kettles and iron axes were alleged to have been found with the bodies. All of these are now lost.

In graves found on Site No. 2, East Aurora, a brass kettle and large quantities of glass beads are said to have been found. These have been lost, but on the surface are still found clay pipes and sherds, chert triangular points, bone awls, shell and glass beads, and iron axes.

Though few European articles were found in the refuse heaps or on the surface of Site No. 22, East Hamburg, such articles were rather abundant in the graves. An iron axe, the rusted remains of three iron knife blades, a few wire bracelets and some glass beads were found. In the same graves were many fine clay kettles, a few fine clay pipes, some chert flakes and a few long beads of a fine reddish sandstone, evidently made by Indians with European tools. Nearly all the articles from these graves are in the possession of the writer.

The presence of traders' articles on the sites of such villages as had established a trade with Europeans, is to be expected; but the absence of such articles from sites occupied in historic times by Indians who for nearly two hundred years had been in close contact with Europeans is noteworthy. Practically nothing has ever been found on the historic sites of Seneca and Onondaga villages along Buffalo Creek to indicate in any way that these people had ever lived there. A few bits of leather moccasin, embroidered with glass beads, were dug up with the bodies of Senecas when they were removed from their cemetery on Buffum Street. Several silver brooches are said to have been found with some bodies, probably Onondagas, on the Potter Road near the ford, in West Seneca. A silver coin of the last part of the eighteenth century and a copper penny of 1797, found, one on Site No. 35, West Seneca, the other on Site No. 8, Buffalo, may, or may not have been lost by Indians. Yet these sites were occupied for upwards of sixty years by a numerous population.

Primitive Artifacts.

Primitive artifacts, unaccompanied by European articles, are found on all the small camp sites on the Niagara Frontier; in refuse heaps; on the small village sites at Fort Erie and on Grand Island; on Site No. 109, and Site No. 110, Bertie, Ont., on several sites on Cattaraugus Creek; and on the great Wenro village sites, No. 7. Buffalo, and No. 35, West Seneca. These all seem to have been inhabited by people unacquainted with Europeans.

Primitive artifacts can most easily be classified according to the material from which they are made. Thus there are artifacts of stone, of bone, of antler, of tooth, of shell, of clay, of skin, and of vegetable material. Because the articles made of stone were more nearly imperishable, more of these have been found than of any other material. It does not necessarily follow that the large proportion of the Indians' artifacts were made of stone. On the contrary, a careful study of the articles found leads one to assume, that the large proportion was not made of stone, but of other materials.

Artifacts Made of Stone.

The Indians of the Niagara Frontier made use of chert, sandstone, and shale, which they found in the local outcrops; and of slate, quartzite, chalcedony and various volcanic rocks which they obtained from other regions.

Chert was employed almost entirely for the points of missiles and the blades of cutting tools. Points for arrows, javelins and harpoons; blades for knives, scrapers, hoes and war clubs;

and points for drills were made of it. Its keen edges made it admirably suited for these purposes. It was obtained from the quarries at Fort Erie, Williamsville and North Buffalo, and from the till of the glacial moraines. It was fractured by means of stones used as hammers, flaked by means of hand hammers, and chipped into shape by means of tiny hammers and, probably, of chipping tools made of bone or antler.

Diorite, trap and other volcanic rocks were used to make axes and chisels, gouges, hoe blades, adzes, pestles, mullers and hammers. These rocks must have been imported, for they do not occur in the region, either native or, seemingly, in the till. They were pecked into shape with heavy hammers, and while some were left rough, the most were ground and polished, by rubbing on sandstone.

Sandstone was employed mainly as an abrasive in grinding and polishing other stones. From it were made the grindstones and whetstones used in sharpening and polishing stone tools. Occasionally chisels or axes were made of a fine grained variety.

The local Hamilton shale is very soft and friable, yet small chisels were occasionally made of it. Small perforated discs of shale are sometimes found on the village sites.

Quartz and chalcedony, though not native to the region are sometimes found on village sites, but more frequently on camp sites. They are usually made up into points and had evidently been brought here and lost by hunting parties.

The Indians of all the villages used bone in making a large variety of articles. Awls and pins, fish-hooks, scrapers, points of weapons, beads, pendants, and many other artifacts, the use of which is unknown, are found in great numbers in the refuse-heaps and graves of the villages. Bone articles have never been found on a camp site in this region. Their presence on village sites and their absence on camp sites may be due only to the fact that on the village sites they have been protected in the graves and middens there, while, because these are absent from the camp sites, all frail articles have been destroyed.

The bone used was obtained from the animals which had been killed for food. Bones of practically all the animals, some birds, and some fishes, were utilized. It was cut into shape with stone tools, and polished and sharpened on grindstones.

Not only did the Indians use the bones of the slain animals, but they utilized the antlers and teeth of deer, and the teeth of beavers and wood-chucks, also. From antlers they made chisels of various sizes, hoe-blades, some points for javelins, and some few tools the use of which is unknown, The incisors of beavers and wood-chucks were used as chisels, and the teeth of other animals including men, were worn as beads or trophies.

The Neuters used shells for a variety of purposes, such as utensils, tools, trumpets and ornaments. Though east of the Niagara River, on the village sites of the Wenrorohnons and the Eries, shells are occasionally found showing signs of use, they are not frequent and seem to have been used mostly as ornaments.

Both local and imported shells were used. The Neuters imported the great conch shells from the Gulf of Mexico, and Busycon from the Atlantic coast. A few imported shells have been found on the Wenro sites. Chiefly however, the source of material for the Wenroes and Eries seems to have been the local brooks, and the chief material, the shells of the fresh water mussel.

Clay was used in making kettles and pipes. It was obtained from the excellent local beds.

Artifacts Made by Chipping or Flaking.

The artifacts made by flaking chert are: Points for (a) arrows; (b) spears, javelins and harpoons; (c) gun-flints; blades for (d) knives; (e) war-clubs; (f) hoes; (g) drills; (h) scrapers; (i) saws; (j) "blanks" for making other implements. Of these forms, a, b, c, d, e, f and g, blend one with another so that it is impossible to say with certainty whether some article is a large arrow-point, a small javelin point, or a knife blade. A thick point might have armed a war-club; but it might equally well have served as a spear point. Many small points, suitable for use as arrow points, show evidences of use as knives or drills, and some points which are usually considered to be drills were surely arrow points. Many "blanks" and rough, seemingly unfinished points may have seen service as blades for war-clubs.

It seems probable that in Indian economy a tool was made to serve many uses, precisely as our pocket-knives are used for a variety of purposes. A small point set in a short handle could be used as a knife; set in a long handle it became a spear; tied to the end of an arrow-shaft it was an arrow point, which if need be, would drill a hole through a bear's tooth, or skin a bear.

All that can be said with certainty is that there are certain types of points, each of which was probably made and commonly used for one certain purpose. For instance the small, keen triangular points were undoubtedly made for use as arrow-points, and were commonly used as such, though some few of them may have been used as drills.

Points and Blades.

Because the points for arrows, spears, javelins and harpoons are distinguished with difficulty from the blades of knives and war-clubs they will be considered here together. Without doubt most of the small and medium sized points were designed to be used as arrow-points The larger ones were either knives or spear-points.

Along the entire Niagara Frontier this type of artifact is abundant. They are most numerous on or near village sites and camp sites, but they are found frequently far from such centers Almost any sandy knoll in western New York or eastern Ontario will yield some artifact of this type.

Though many are rude, rough and dull, these artifacts are characterized by careful and excellent workmanship. The keen point is the rule. The points and blades are of many shapes. Practically every shape found in the United States has been found in this region. Excepting in two villages, no village or camp is limited to any one shape; nor on the other hand, is any one shape confined solely to any one site or locality. Yet almost every large village is characterized by the predominance of some one type.

In general all points and blades may be divided according to their shapes into two classes, namely, notched and unnotched. The former type has notches, or a tang, at its base, to afford greater security in binding the point to its shaft. The latter has no such notches but is a simple triangle, with straight or curvilinear sides. The type is a straight-sided, isosceles triangle, narrow in proportion to its length, keen-pointed, thin, sharp-edged and delicately chipped. It is much smaller than the notched type, having an average length of an inch and a quarter and a width of but three-eighths of an inch. The straight sides of the type frequently become curvilinear and the straight base often becomes concave, forming in exaggerated cases, vicious barbs.

This unnotched triangular point is essentially an Iroquoian type. It characterizes the entire region once occupied by the Five Nations, from the Hudson to the Niagara. Other types are found along with this type, but so steadfast is this that it may be styled a true Iroquois type. West of the Niagara it also occurs, but either not so freqnently or as a modified form. The Neutrals used this type, though the most nearly typical Neutral point is a small triangle, modified by the addition at the base of notches, making it a notched type. The Hurons, also, used the triangular type.

Being Iroquois, the triangular type is strictly a village type, that is, it characterizes the villages, rather than the camp sites. Throughout the entire Frontier every village site is characterized by this type. Other shapes may occur on the sites, but the points of the triangular type predominate. For instance, on Site No. 22, East Hamburg, every point found is a triangle. Though points of all shapes are found in abundance on Site No. 7, Buffalo, yet of the two hundred found in its refuse heaps, every point was a triangle. Of the large number of points found by Mr. Parker on the Erie site at Ripley, N. Y., but two were notched.

Just as the village sites are characterized by triangular points, so are the camp sites characterized by the notched type of point. Every camp site on both sides of the Niagara River yields them;—some sites in abundance. They are usually well chipped, but not so delicately worked as the triangular points. They are frequently of a browner chert than our local chert, and sometimes they are made of chalcedony or some other foreign material.

Though characteristic of the camp sites, notched points are not confined to camps, They occur on most village sites. But two sites, No. 110, Bertie, and No. 22, East Hamburg, fail to yield them. They are absent from the refuse heaps of Site No. 7, Buffalo, though abundant on the surface. On the East Elma

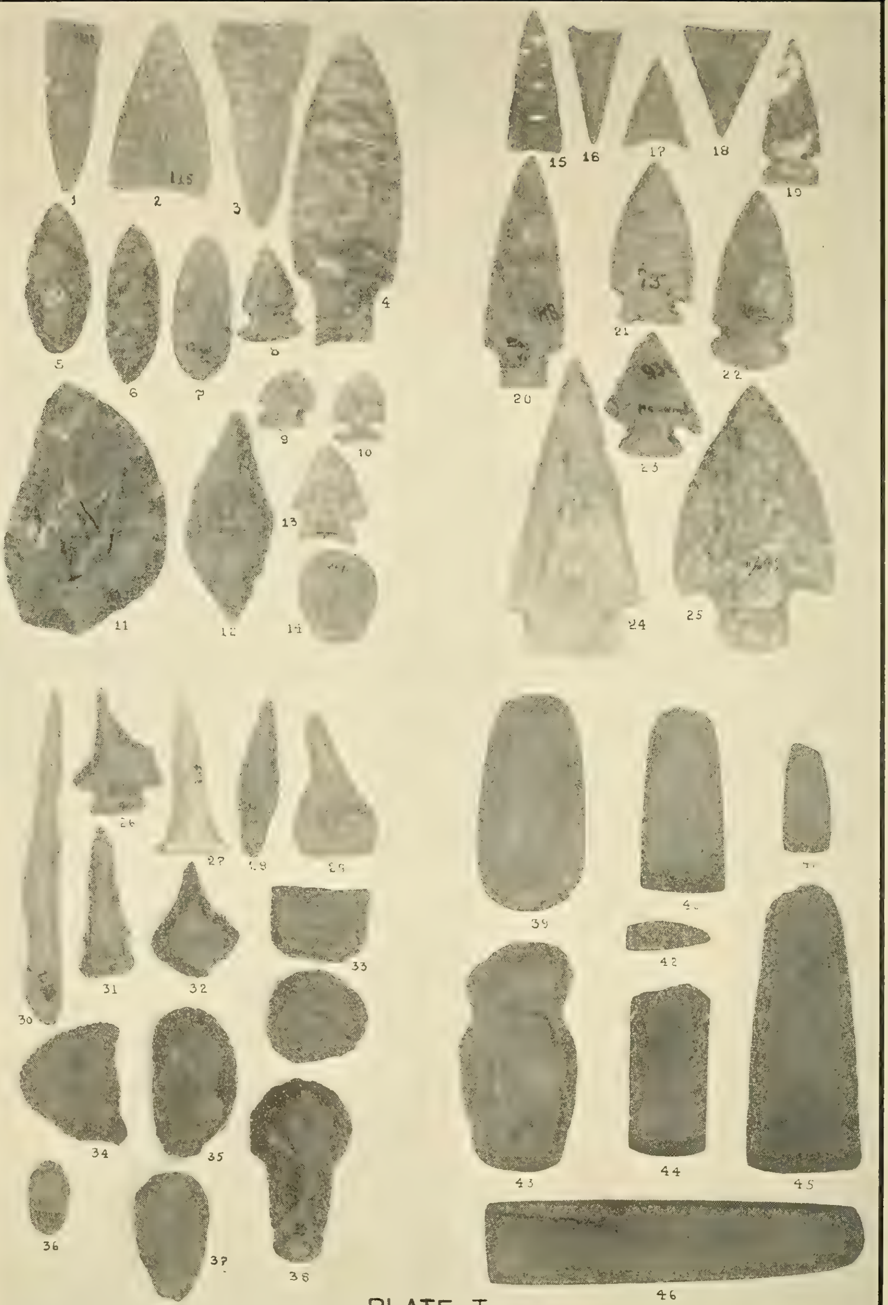
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PLATE I

group of villages they are scarce. On Site No. 34 and 35, West Seneca, they form a large proportion of the points. On the Mountain Ridge group, none are reported as having been found, though it is probable that they occur there.

On Plate I, Nos. 8, 9 and 13, though of size suitable for spear points, are evidently knives. They show signs of having had long usage as such. The edges are dulled, and the base of No. 8, is worn smooth. It seems to have been loosely hafted and worked back and forth in its socket.

The elliptical and oval blades shown on Plate I, Nos. 5, 6 and 7 come from the Buffalo Creek group of sites, where they are rather common. They are well made and evidently were knife blades. The double-pointed blades are occasionally found on the same sites. Fig. 11, is an excellent example of the so called "Eskimo Woman's Knife". It was found near Site No. 34, West Seneca, on the side of a glacial hill.

It has been suggested that blades of the type figured in No. 6, Plate No. I, were set into the head of a war-club, much as iron points were set later. This is merely conjecture. The blade, Fig. 12, is a type found occasionally in fields near villages; these were probably hoe-blades.

Scraper blades are figured in Plate I, Nos. 35, 36, 37 and 38. They were used in scraping fat and flesh from hides and perhaps, also, as planes in wood-working. The type is oval in outline, wedge shaped in longitudinal section, with one edge beveled. Frequently they are some what concavo-convex. They are abundant in all the villages of the Niagara Frontier. Occasional scrapers with notched bases are found.

Fig. 34 shows a blade that might well be called a scraper, but it is modified by the addition of serrations on its cutting edge. It may be a saw. It comes from Site No. 22, East Hamburg, where such articles are frequently found. Only one other site yields them, namely No. 110, Bertie.

Like the triangular points, the scrapers are a village type. They seldom are found on camp sites.

Indians frequently found it necessary to perforate bones, stones or shells. This they accomplished in several ways. In this region all perforations seem to have been made by means of flint drills. The type is essentially a shaft of chert, triangular or lozenge-shaped in cross-section, pointed at one end, and at the opposite end expanded at right angles into a flat handle. It is T-shaped, resembling our gimlets in outline. It is shown in Plate I, No. 27. Occasionally drills are found which have notched or stemmed bases. These have usually been made from broken arrow-points. One such is shown on Plate I, Fig. 26.

The drill seems to have been evolved naturally from the arrow-point. An arrow-point would serve as an excellent drill for large perforation, and many points are found that show evidence of such use. To make a finer hole the point would require only to be chipped narrower. Some drills are actually so made. Occasionally drills are found which show in their smoothed and worn edges and points the evidence of much use.

A drill point of this type might have been held while in use in the fingers, or it might have been attached to a shaft and twirled by means of a bow, or a cord and weight or some other mechanical means. The hole made by it would always be countersunk, and would often show striations in its interior.

The fact that some of the vlllages were inhabited and abandoned before the advent of the Europeans accounts for the absence of gun-flints in their refuse heaps and graves. Even in those villages in whose graves and middens European articles are fonnd, gun-flints have never been found. Occasionally on the surface a few points have been found which might have been home-made gun-flints. Plate I, Fig. 33 shows one of these, and Fig. 29 shows a European flint which was found in place in the hammer of a musket.

Polished Stone Artifacts.

All or nearly all the stone from which artifacts of the polished type were made was imported. The native rocks, limestone, shale and gritty sandstone were unsuited for such use, so the striped slate, fine grained sandstone, marble, steatite, greenstone, diorite and basalt, which were made up into these artifacts, were all brought from a distance. Pipes, axes, chisels. hoes. gouges, beads, ''bird-stones'' and gorgets were made from these rocks by battering, grinding and polishing.

The whole region is characterized by an abundance of ungrooved ''celts''. Most of these are undoubtedly axes; many are probably chisels or wedges. The type and the range in size and shape are shown in Plate I. As a whole these celts are well made Some are polished on the cutting edges only; on most the polish extends over the entire surface. Sometimes the materials are a rather fine sandstone which is found in stream beds, and shale. The most of these "celts", however, were made from imported volcanic rocks, diorite, basalt and trap.

In one village, Site No. 35, West Seneca, a few of these celts have been modified by the addition on the upper and lower edges of four notches, evidently to give greater security to the hafting.

Several specimens of "beveled" celts have been found in the region. These differ from the typical celt by being in cross-section a trapezoid instead of an ellipse, One was found on a camp site, No. 73, West Seneca; another on a village site, No. 34, West Senecs. They were probably used as bark-spuds or as adzes. One is shown on Plate I, Fig. 39.

Two unfinished axes show the processes of manufacture. One has been battered into the shape of an axe, but has been left unsharpened and unpolished. The other is not so far advanced; it was ground into shape and left unpolished and unsharpened.

Grooved axes are almost never found in this region. Two were found on camp sites in West Seneca. A very large and beautiful axe, found on Grand Island, is owned by Dr. Ernest Wende. A rudely grooved stone tool, possibly a hoe was found on Site No. 34, West Seneca.

This region is characterized by a great variety of stone pipes. Most of these are beautifully made and many show a considerable artistic talent. Marble, steatite, slate, sandstone and limestone were used in their manufacture.

The type of stone pipe known as the "totem" pipe, though not unknown is rare. One was found by Dr. A. L. Benedict in the vicinity of Fort Erie. It represents possibly a panther. A similar one was found by Mr. Parker in a grave of the Erie site at Ripley. A third is in the possession of Mr. Bauder, East Elma. This is made of rather coarse sandstone, and carved on each side of the bowl is a figure, possibly human. A fourth was found near a camp site in West Seneca. It was said to be carved in the form of a snake. A pipe found on Site No. 110, Bertie, is said to have been carved to represent a human head. One found in the Neutral Cemetery on Grand Island has on it a fine carving of a man. Other pipes that have been found have been carved in a large variety of shapes.

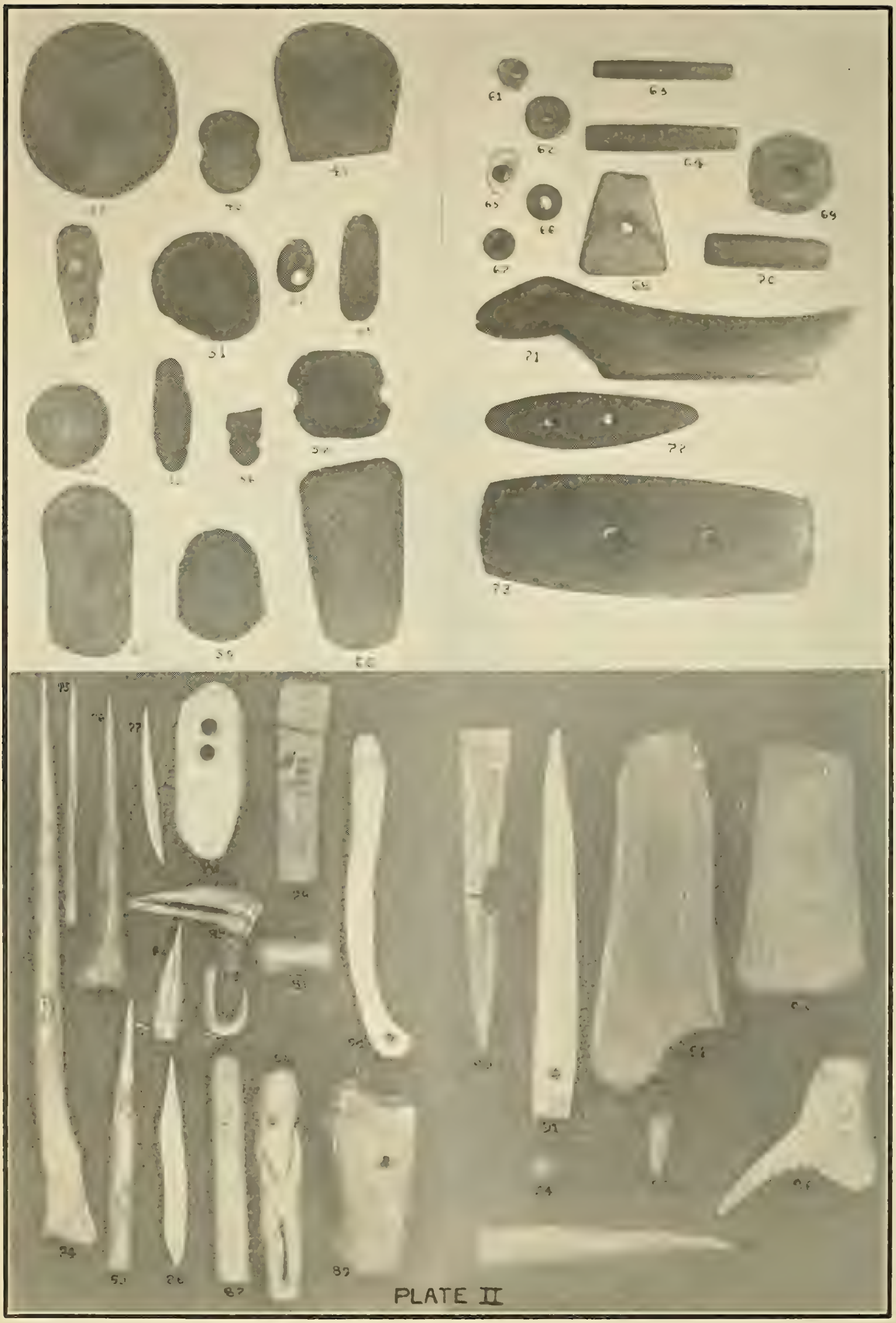


PLATE II

A few stone beads have been found on the village sites; none have been reported from the camp sites. One of steatite, was found on Site No. 35, West Seneca. Several made of fine red sandstone, perhaps catlinite, were found on Site No. 22, East Hamburg. One of these was a disc. The others were long slender cylinders and square prisms. Three long slender beads made of catlinite were found in the Neuter cemetery on Grand Island.

Gorgets were rare. Most of those found have come from camp sites, only one having been reported as found on a village site, namely Site No. 7, Buffalo, Plate II, Fig. 72. The material used is slate, sometimes the striped Huron slate. One from a camp site is shown on Plate II, Fig. 73.

Five "bird-stones" have been found, all on village sites, One, the only perfect one, is figured on Plate II, Fig. 71.

"Banner-stones", and "tubes", common in other parts of the United States have never been reported as having been found on any site on the Niagara Frontier.

Stone Slightly Modified for Use.

Many stones could be used for certain purposes with little or no modification. Smooth pebbles picked up in a stream bed, nodules of chert from a gravel hill, rough blocks of sandstone, all were made to serve some purpose.

Near the lakes and the Niagara River net-sinkers are abundant. These are usually flat sandstone pebbles, notched on opposite sides, Plate II, Fig. 57. Small, naturally perforated pebbles, ("lucky stones") are often found in refuse heaps, Plate II, Fig. 52. These may have been used as sinkers for fishing lines. A small piece of shale on the opposite sides of which notches had been sawed, probably also served as a sinker, Plate II, Fig. 56, as did a pebble of the size and shape of a man's finger, around which a notch had been sawed, Plate II, Fig. 53.

Pitted stone hammers are numerous on all sites in the region. Rough stones pitted in a variety of ways are sometimes found. An irregular flat piece of sandstone, 9 inches long and 6 inches wide, found on camp site No. 74, West Seneca, has on each side a deep pit, the size of a walnut. These two pits almost meet. Another from camp Site No. 69, Hamburg, has three pits. Hammers were not all of the pitted type. In a refuse heap on Site

No. 7, Buffalo, were found two egg-shaped pebbles, on opposite sides of which are two notches. These look like net-sinkers, but they have the battered and fractured surfaces which show use as hammers. Small balls of chert and sandstone, sometimes somewhat rounded by pecking, oftener unmodified, are occasionally found on village sites. These may have been inserted into the heads of war-clubs. Stone mortars are rare. Occasionally a small slab of sandstone, with a concave depression on one or both sides, is found in the refuse heaps. These may have been mortars. More probably they were used as grindstones.

In the refuse heaps of Site No. 7, Buffalo, are found numerous flat, shale discs, roughly circular, unpolished, but perforated. They may have been strung as beads, Plate II, Figs. 61, 62 and 69.

On the Buffalo Creek group of villages are found sandstone celts and chisels, made by grinding a smooth waterworn pebble to an edge.

Unworked Stone.

Unworked stone supplied many primitive needs. Rough stones which still show by their reddened, cracked and calcined surfaces the action of fire, were probably used to support kettles in a fire, or were heated in a fire and dropped into a kettle to heat the water. Sandstone pebbles made good whetstones and on them were ground stone axes, ornaments and bone implements. On one site there is an abundance of rounded waterworn pebbles, of the size of a man's fist. These are foreign to the locality and were probably brought there to serve as missiles in case of an attack on the village. Many rongh pebbles show marks of use as hammers. On many sites are numerous flat, smooth sandstone pebbles, which though they show no marks of use, are foreign to the site, and must have been brought there for some purpose. They may have been used in skin-working or in making pottery.

Artifacts of Bone.

In all the village sites, articles made of bone are abundant; and in the refuse heaps they have been preserved in a manner truly surprising. They are never found on camp sites. This is not necessarily because the people who occupied the camp sites did not use bone implements, but because, if they did, there were no refuse heaps in which the fragile articles could be preserved.

The most abundant of the bone artifacts are the awls. These were used in sewing skins together in making clothing. They are abundant on all village sites. They vary in shape and size, no two being alike. Their one common characteristic is the point, which may be sharp as a needle, or very obtuse. The type is a slender piece of bone three inches or thereabouts in length, keenly pointed at one end and rounded off at the other. Many are formed of slender bird or animal bones, of which the articulated end is left, the other removed and the bone then rubbed down to a sharp point. Figs. 74 and 76, Plate II, show this type.

Of the many implements classed as awls, it is probable that some were for an entirely different purpose. The blunt pointed "awls" may have been used as pins to fasten skin garments together. Some long, heavy pointed tools have been found, in shape like an exaggerated awl, which are fitted for use as daggers; but they are equally fitted for use as corn-huskers, or bodkins for basket-making. Figs. 90 and 91, Plate II, show specimens of this type. Others which are classed as awls may have been arrow-points.

Amongst the Indians fishing was more a matter of spearing or seining than of angling. That they did angle, however, is clearly shown by the occurrence of bone fish-hooks. So far as they are reported, they have been found on but two sites, namely, on Site No. 7, Buffalo, and on Site No. 35, West Seneca. In the refuse heaps of these sites five hooks have been found. They are small, unbarbed, but keenly pointed. All are knobbed for security in fastening to a line. Fig. 83, Plate II, shows one of these. Several pieces of bone and some unfinished hooks show very clearly the process of making these hooks.

Hollow bone cylinders are very abundant on all the village sites. These are made by cutting hollow bird bones transversely into short pieces. They are usually smoothly polished and the cut ends sometimes show signs of wear. They vary in length from an inch or even less to about three inches. They were evidently worn as beads, though some of the larger may have been plume-holders.

Variously shaped pieces of flat bone were frequently perforated for use as pendants. Plate II shows several of these. Unworked bones, perforated for suspension are sometimes found.

Articles of unknown use are sometimes encountered in the refuse heaps. Amongst these are phalangeal bones, probably of the bear, many of which have been worked in various ways. Some are smoothly polished. Some have the ventral surface flattened. Some are perforated longitudinally, others at right angles to the long diameter. The larger articulated ends of several have been cut away, the spongy interior removed and a hole bored at the small end making servicable pipes. Some are merely broken as though to extract the marrow.

Various uses have been ascribed to these. They have been called whistles. They much resemble bones still used amongst both Indians and Eskimo in playing certain games. A few would certainly make good pipes and others could be used to hold dangling plumes.

One solid cylinder, similar in shape to certain articles of antler has been found. This may have been a ''pitching tool'' used in chipping chert. Two small pointed articles may have been barbs for a spear. Fig. 80 is of unknown use, an amulet, perhaps, or a record. The bone image shown on Plate II, Fig. 88, was found on Site No. 23 in East Elma.

Artifacts Made of Antler.

In a hunting community, antlers must have been abundant, and of all the material available for the manufacture of tools, it was the most easily worked. In the middens of the village sites articles made of antler are fairly abundant, but on the camp sites none are ever found.

Fig. 97, Plate II, shows a point suitable for a spear. Its base is hollowed out for the insertion of a shaft.

Fig. 96, Plate II, shows an article which may have been a weapon. It is neatly worked. In Fig. 92 is shown an implement that was probably used as a gouge or an adze, or perhaps as a hoe-blade. Its cutting edge is blunted from much use. The flat plate of antler shown in Fig. 93 was probably a chisel, as was the end of a prong, shown in Fig. 95. From all the sites come slender cylinders, of various lengths, from an inch and a half to three inches. These are figured on Plate II, Fig. 87. The use of these is unknown. In Canada they are called pins. Mr. Parker calls them "pitching tools" for use in chipping chert. They resemble certain wooden cylinders used by Indians in the Northwest in gambling, and so have been called "gambling sticks."

In the refuse heaps of Site No. 7, Buffalo, were found three spheroids, of the size of marbles. They resemble the peach-stones used by the Senecas in gambling and probably were so used, Plate II, Fig. 94.

Artifacts Made of Shell.

It seems strange that with mussels abundant in every stream, their shells did not take a more prominent place in the domestic economy of the Indians. Shells of the fresh water mussels are not often found in the middens, and artifacts made from shell are also seldom found. This may be due to the friable nature of the shells though some few shell articles are preserved in the middens and graves of the villages. Of these a large proportion are made from the massive shells of the great conch or other ocean shells. No shell articles have ever been found on camp sites.

The shells used were not only the local shells of the streams and lakes, but shells from the ocean. The local shells were the various species of Unio, Goniabasis, Melantho and Pleurocera. The ocean shells employed were the Busycon and Fulgur and perhaps, the Strombus.

The local shells were obtained from the near-by-water-courses, but the ocean shells were imported. The Neutrals had a large commerce with the natives of the southern coasts in "Vignots", probably Strombus.

The Fulgur and Busycon were probably brought from the east coast. The shells of the Unio were adapted for use as cups or dippers without modification; and many were undoubtedly so used. These would show no traces of workmanship or of wear

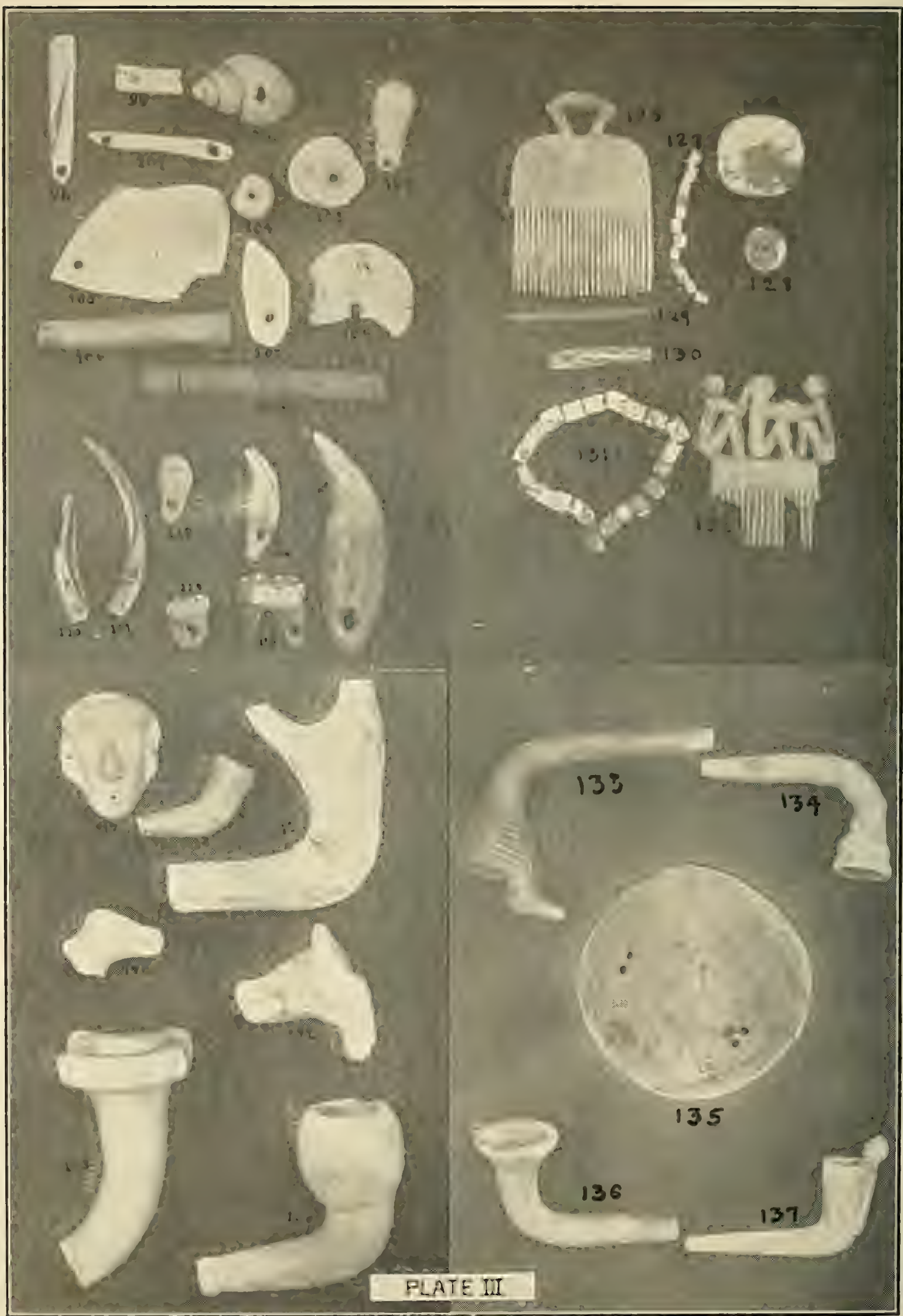


PLATE III

and so can not now be identified as such. A few shells of this species have been found from which the rough portions of the hinge have been removed. These had evidently served some purpose, perhaps as cups or dippers, perhaps as knives.

In the refuse heaps of Site No. 7, Buffalo, a few poorly wrought beads were found. Some of these are discoidal, some roughly cylindrical. They were cut from the hinges of Unio. Numerous fragments of hinge from which the thinner valvular portion has been removed show the manner of making these beads, and unfinished beads in all stages of manufacture occur. A few pendants made from Unio valves have been found. Plate III, Figs. 98, 101, 107, and 108 show several such.

In the graves of two sites namely, at Port Colborne and at ''Kienuka'', large irregular plates cut from the parietal portion of some imported shell, perhaps the Busycon or Strombus, were found. These are perforated. In spite of their unwieldy shape and large size and consequent weight these were undoubtedly used as pendants. With them on both sites were found numerous smoothly wrought, perforated discs, from half an inch to an inch in diameter. The shell from which these were cut was probably the Busycon. In an ash heap on Site No. 23, Elma, was found a shell pendant, also made from some sea-shell, Fig. 105, Plate III.

Shell articles in a large variety were found in the cemetery at the ''sand-pits'' at Stamford (Site No. 107) and on Grand Island (Site No. 30).

From the ''sandpits'' came an entire shell of Strombus gigas. A perforation in the edge of the lip was evidently made for suspension upon a cord to facilitate carrying it. Two very long cylinders cut from columellae and some shorter cylinders were also found.

On the Van Son site were numerous articles made of massive shell. Most numerous were the flat disks and short thick cylinders. Besides these there were cylinders as thick as a lead pencil and from 1 1/2 to 2 inches long perforated lengthwise; heavy pendants, one the size of a man's thumb; a few beads of different shapes, spheroid, semi-spheroid, and hour glass shaped, and two large gorgets. The largest of these is 5 inches in diameter. It was found in place concave side up, on the lumbar vertebrae of a skeleton, Plate III, Fig. 135.

Articles Made From Teeth.

Teeth which had been used as ornaments, or trophies, and tools, have been found on the village sites; none have ever been reported from the camp sites.

The keen cutting edge of a beaver's incisor would make a very efficient chisel for small or fine work, and many teeth, not only of the beaver, but of the woodchuck, were undoubtedly so used without modification. Often however the incisors of these animals are found which had been worked into a more convenient shape or size. From some the jagged roots have been cut off. Others are split, as though for finer work, and the rough edges have been rubbed smooth, Figs. 110 and 111, Plate III.

Many perforated teeth of bears, deer, elk and wolf are found on all the village sites. These were evidently worn either as mere decorations or as trophies of the chase. A few human teeth thus perforated have been found on Site No. 35, West Seneca. Figs. 112 to 116, Plate III, shows some of these teeth. A few bears' teeth have been found, the roots of which have been cut off.

Articles Made of Clay.

Artifacts made of clay are rare on the camp sites on both sides of the Niagara River. A very few fragments of pottery have been found on them, and this is usually of the "cord" or "cloth" marked type, that is they are covered with the impressions of cords or textiles made on the exterior when the clay was soft. No clay pipes have ever been reported from camp sites.

On the village sites on the contrary, potsherds and clay pipes are so abundant that they constitute an unfailing characteristic. Their presence on these sites may be due to the protection and preservation afforded by the refuse heaps and graves.

On the village sites the pottery found is almost uniformly well made of fine materials, smoothly finished and artistically decorated. Poorly made specimens are sometimes found but they are the exception. The clay used is the local material from nearby beds. As this burns red, the pottery is usually reddish or brown. A few gray specimens have been found. The potters used for a tempering material pulverized granite or chert; in a very few specimens pulverized shells were so used.

In the refuse heaps only fragments are usually found. These fragments vary in size from tiny bits to large portions of a vessel, and in some cases they can be pieced together. A few fragments have been found which show that the kettle of which they formed a part was repaired before being finally discarded. Evidently when a crack appeared, rather than throw away the kettle a hole was bored on each side of the crack and the pieces were then bound together with cord. Evidently when the vessels were finally discarded in a more or less broken state the little Indian boys completed their demolition by throwing stones at them, for amongst the fragments of several kettles were found the stones that finally broke them. The slovenly habits of the Indian cooks are shown, many of these fragments being encrusted with a thick deposit of charred food, evidently the remains of several meals that had not been washed off the kettles.

From the refuse heaps of Site No, 7, Buffalo, come lumps of burned clay. These were evidently dropped from the hands of some potter and found their way into the fire and thence to the ash pile. Some of these show the thumb-marks of the aboriginal potter.

A large number of entire vessels have been recovered from the sites along the Niagara Frontier. A great many were taken from Site No. 4, Brant, by Mr. Parker and are now in the Peabody Museum, Cambridge. He was also fortunate enough to recover many vessels from the Erie Site at Ripley. This site however is not included in the Niagara Frontier. Two burying grounds of Site No. 22, East Hamburg, were excavated by contractors who used the gravel in which they occurred for ballasting railroad tracks. Many kettles were found but few were preserved. Of the six known to have been preserved the writer found four and the other two were retained by the contractors. In the graves of Site No. 7, Buffalo, but two were found. One badly broken was found by the writer; the other is in the possession of Mrs. Harold R. Robertson, Buffum Street, Buffalo. One was found on Site No. 8, Buffalo, and was kept by the lessee of the property. Many were taken from the graves in the ''Sand-pits'' near St. David's, Ont. Of these Dr. Benedict has nearly all that were preserved. One was found at Port Colborne and is now in the Museum at Toronto. Three entire, and several broken vessels were found in the Neuter Cemetery, Grand Island. One was found at Fort Erie beach by W. L. Bryant and is now in his possession. One found on the beach at Fort Erie by Dr. H, U. Williams is in the Museum of the Buffalo Society of Natural Sciences.

All the vessels with one exception that have been found are of the same shape, but they vary in size and in the character of decoration. With two exceptions all are round with round bottoms. One exception came from the St. David's site and is elliptical in outline with handles. The one found by Mr. Bryant is pointed at the bottom. But one had handles, though a fragment found in a refuse heap on Site No. 7, Buffalo, had one attached to it similar to a pitcher handle. In one type found at Ripley the rim was extended at one point to form almost a pitcher spout. In some the rim is extended upward into points. This type occurs amongst those found at Ripley and in the villages of the Buffalo Creek group. Nearly every vessel has been decorated by some design impressed or incised.

In size the vessels vary greatly. The smallest, of which only one-half was found, came from a refuse heap on Site No. 7, Buffalo. It is of the size of a small tea-cup. A small vessel which holds about a pint came from Site No. 22, East Hamburg. The largest, which is represented by fragments of the rim only, came from a refuse heap on Site No. 35, West Seneca. This would be when entire about 18 inches in diameter and might hold perhaps, three pecks.

Pipes made of clay are rather abundant on the village sites though they have never been reported as found on camp sites. A few are rough, ill-worked and clumsy; most, however, are well-made of fine material and some combine fine workmanship with artistic taste. The material seems to be the local clays which were usually very finely triturated and mixed with finely pulverized chert.

Though there is an almost inexhaustible variety in the shape and size of these clay pipes there are two types which occur so frequently that they may be said to be characteristic. These are found so constantly amongst all the people of Iroquoian stock that they may be called Iroquoian types. These two types are shown in Figures 123 and 124, Plate III. Other forms of clay pipes are shown in Figures 118, 133, 134 and 136, Plate III. Pipes made to represent animal forms are sometimes found. Figures 119, 120 and 122 show two of these found on Site No. 22, East Hamburg. They probably were intended to represent the wolf and the snake. A handsome clay pipe from the Neutral cemetery on Grand Island has upon it the representation of the head of a bird, perhaps a crow, Plate III, Fig. 133. Another was rudely modeled into the shape of a snake, Plate II1, Fig, 124.

A Summary.

A portion of the Niagara Frontier is now occupied by two tribes of Indians, the Senecas and the Tuscaroras, with whom are mingled a few of the other Iroquois nations. They live on three reservations on the Frontier, the Senecas on the Cattaraugus and Tonawanda Reservations, the Tuscaroras on their reservation on the ''Mountain Ridge''. For sixty years, from 1780 until approximately 1840 the valley of the Buffalo Creek was a reservation on which lived the Senecas who now inhabit the Cattaraugus Reservation, and with them a few Cayugas and Onondagas.

Between 1700 and 1780 the Frontier was sparsely settled by Senecas and Missisaugas. Seneca villages existed at Lewiston, at the site of the present Tonawanda village, perhaps at Falkirk, N. Y., probably at Site No. 2, Aurora, and at several places in the Tonawanda valley not now certainly known. The whole Frontier at that time was a hunting ground for Senecas and probably for the Missisaugas. West of the River the country was in the possession of the Missisaugas whose bands wandered over the whole Niagara Peninsula. To these Missisaugas must be attributed some of the camp sites on both sides of the river, and it is probable that the large collections of points in the possession of Mr. McFarland, at Niagara-on-the-Lake and of Mr. Baldwin and others west of Lockport, are partly at least of Missisauga origin.

Between 1656 and 1700 the region on both sides of the river seems to have been unoccupied; but it was a hunting ground for the Senecas who probably had bases, more or less permanent at the site of Fort Niagara and on the sites of abandoned Wenro villages, at Sites No. 8, Buffalo; No. 34 and 35, West Seneca; No. 22 East Hamburg; No. 23, 24 and 25, East Elma and No. 2, Aurora; possibly also at Falkirk and on Tonawanda Creek. The occupation of these sites by the Seneca refugees in 1780 is evidence that they were perfectly well known to them at that time and it is quite probable that these sites were never entirely without occupants.

From some time unknown until 1656 the southern portion of the Frontier was occupied by the Eries, a nation of Iroquoian stock. They lived at one time on the shores of Lake Erie but were driven thence by enemies from the west and compelled to settle farther inland. Their northern frontier was, perhaps, at Eighteen Mile Creek, in Erie County, though they had no large villages farther north than Cattaraugus Creek. They were destroyed as a nation by the Senecas in 1656. There is ample evidence of their occupancy in the Relations of the Jesuits.

From some unknown date until 1652 the Frontier was occupied by the strong Neutral Nation. Their villages were farther west in the Niagara Peninsula but one existed at "Kienuka", Site No. 39, Lewiston; one at Site No. 57, Wheatfield N. Y.; one at Site No. 30, Grand Island; two small ones on the Sites 1 and 2, Bertie; one at Port Colborne; one possibly on the river bank at Fort Erie; one, the location of which is also unknown, but whose burial place was in the "Sand-pits" near St. David's, was perhaps the "Atiragenrega" of Franquelin, perhaps the "Niagagarega" of Creuxius. "Kienuka" may have been the "Ondieronius" of Creuxius or the "Ouaroronon" of Father Dallion. By these words each meant more probably, "Wenrohronon".

Of the Neutral occupancy of three or four villages east of the Niagara River we have the word of the Jesuits and this is corroborated by archaeology. The artifacts at Cambria, are undoubtedly Neutral. Of the Neutral occupancy of the sites named west of the river there is also ample historic proof which is corroborated by their archaeology.

From an unknown date until 1639 a portion of the region east of the Niagara River was occupied by the Wenrohronons who were either a branch of the Neutrals or a separate nation of the Iroquoian stock. They lived in two or perhaps three villages. One of these villages is represented by the group of sites, Numbers 7 and 8, Buffalo; 34 and 35, West Seneca and possibly No. 22, East Hamburg. A second is represented by the group of three sites at East Elma. A third perhaps was at Shelby, N. Y. A site at Oakfield may have been Wenro. It was a defended site and the remains found there indicate a people of Iroquoian stock. It corresponds in direction and distance to the situation of the village "Ouaroronon" of Father Dallion. Those who have studied it, however, say that it is undoubtedly an early Seneca site.

There can be little doubt that these two villages named were inhabited by the Wenrohronons. There is sufficient historic evidence that such a nation existed, that they occupied the region east of the Neuters, and that their easternmost village was situated a day's journey west of the Iroquois frontier. There seems to be no doubt that the Seneca outposts at that time were some twenty miles or more west of the Genesee River and that a few small Seneca villages existed west of that river. A line drawn a day's journey west of this indefinite line runs through Oakfield, Shelby and Elma. Oakfield is said to be a Seneca site, and the same may be said of Shelby. The group at Elma, however, answers the Wenro description perfectly, and since the remains found in the Buffalo group of sites are identical with those found on the Elma sites, the Buffalo group must also be said to have been a Wenro village.

The archaeology of the Buffalo and Elma gronps of sites corroborates the testimony of history. The Wenrohronons were described by the missionaries as being numerous, sedentary and of Iroquoian stock. The sites at Buffalo are probably the sites of a large village, which, according to Indian custom, had been moved from one to another of these sites. The same can be safely said of the Elma group. All the remains found on both groups are Iroquoian in character. The primitive artifacts ally the inhabitants to Neutrals, Eries and Senecas, yet they differ from these in details. A bone image, a large bone "dagger" and some of the pipes found at Elma suggest the Senecas; the pottery, arrow-points and bone artifacts suggest Neutrals or Eries. Yet the artifacts have an individuality of their own, marking them as neither Erie, Neutral nor Seneca.

According to the story of the Jesuits the Wenrhoronons had held some intercourse with the traders but not much. Amongst the remains found on the Elma and the Buffalo sites very few European articles are found, and these are graded from none at all on Site No. 7, Buffalo, to a very few on No. 35, West Seneca, more at East Hamburg and still more at Barnard Street, Buffalo.

The Wenrohronons are known to have been harassed by the Senecas and finally driven from their villages. It is significant that near the Elma group of sites is a group of defensive earthworks which did not surround villages. They seem to have defended camps. This, when correlated with the equally significant fact that the most recent of the Elma sites is on a high point formed by the junction of Buffalo Creek and a deep ravine, seems to indicate that when this site was occupied there was need for a strong position which could be easily defended against small parties, which on their part were constrained to defend their own camps. The same thing can be said of the Buffalo group. Site No. 7 was a defended village and the most recent of the group, Site No. 22, East Hamburg, is enclosed on three sides by deep ravines, and on it occurs an abundance of imported stones of a size suitable for missiles.

The Elma and Buffalo groups of sites are believed, then, to have been inhabited by Wenrohronons because they were occupied by a numerous, sedentary Iroquoian people who lived east of the Neutrals and approximately a day's journey west of the Senecas and the most recent sites show a state of war. They thus answer to the Jesuits' description of the Wenroes.

Before the advent of the Iroquois people, Senecas, Tuscaroras, Neuters, Eries and Wenroes, the Niagara Frontier was the hunting ground and perhaps the permanent home of a tribe of wandering people or perhaps of several such tribes. These people established no villages but followed the water-courses from place to place in pursuit of game or in search of wild fruits. At certain well-known stopping places they established camps and some of these they visited regularly, perhaps, year after year. The camp-sites which are scattered over the country are these stopping places.

The identity of these wanderers can never be ascertained. They were not of Iroquoian stock. The remains upon their camp-sites are so different from those on the Iroquoian sites that this can be safely said. They were probably not all of the same nation. A chalcedony drill found on Site No. 69, Hamburg, and a large chalcedony flake found on Smoke's Creek seem to have come from the west. From the west or south, also, came the striped slate gorgets sometimes found on the camp sites. It is quite possible that some of these camps were established by Missisaugas.

When the camp-sites were occupied can never be known. Some may have been occupied in the eighteenth century. Many doubtless antedate the Iroquoian occupation.

Indian Names of Localities, Erie County.

AMHERST.

Ellicott Creek—Ga-da-o-yah-deh, level heavens.

Williamsville—Ga-sko-sa-da-ne-o, many falls, (Morgan).
Ga-da-ya-deh, place of misery or "open sky," (Marshall).

BRANT.

Brant—Derived from Joseph Brant, Thayendanegea.

Delaware Creek—It is possible that this took its name from the Delaware village near its head.

Cattaraugus (Creek)—Fetid or bad-smelling banks.

Ga-da-ges-ga-o—Cattaraugus Creek (mouth). Same as above.

R. a la terre puante—French translation of Cattaraugus. It appears on Pouchot's map.

BUFFALO.

Buffalo—English translation of Indian, "Tick-e-ack-gou-ga", or a translation of "De-gi-yah-go" a man's name, meaning "the buffalo".

Buffalo Creek—English translation of Indian, "Tick-e-ack-gonga-ha-un-da", meaning "buffalo creek".

Ne-o-thro-ra, Tuscarora name for Buffalo.

De-o-tro-weh, Cayuga name for Buffalo.

De-ose-lole, Oneida name for Buffalo.

Do-syo-wa or Do-sho-weh, "place of bass-woods", Buffalo. (Marshall).

De-dyo-we-no-guh-do, "divided island", Squaw Island.

De-yeh-ho-ga-da-sea, "The oblique ford", was the name given by Marshall for the "old ford at the iron bridge". The "iron bridge" was on Abbott Road, across Buffalo River, but there was no ford there, so far as known. There was an "oblique ford" on Cazenovia Creek. This was close by the

Seneca village and is probably the one referred to. Another "oblique ford" was on South Park Avenue where it crossed Cazenovia Creek.

De-yoh-ho-gah, "forks of the river", the old junction of Buffalo and Cazenovia Creeks, at the bridge, on South Park Avenue, near Seneca Street. This has been changed by the digging of an artificial channel.

De-o-steh-ga-a, "rocky shore", Morgan's name for Black Rock, a part of Buffalo. Marshall's name is

Dyos-daah-ga-eh, "rocky bank".

Dyu-ne-ga-nooh, "cold water". Cold Spring, a part of Buffalo. This may have been the name for the spring which gave this one-time suburb its name.

Dyos-da-o-doh, "rocky island". Bird Island.

Go-nah-gwaht-geh, Indian name for a grass.

Jo-nya-dih, "the other side of the flats", Tifft farm on the lake shore, foot of Tifft Street.

Scajaquada (Creek)—A form of the Seneca personal name, "Sga-dynh-gua-dih" (Marshall) or "Sken-dyongh-gwat-ti" (Wright). This was the name of a Neuter (?) captive who lived on this creek. Anglicized, his name became John Kenjockety. His Seneca name meant "beyond the multitude".

Ni-dyio-nyah-a-ah, "narrow point" was a Seneca name for the parcel of land in a loop of Buffalo River, west of the Lake Shore Railway. Locally it was known as "Farmer's Brother's Point", from the chief of that name. (Marshall).

O-gah-gwaah-geh, "residence of the sun-fish". At the mouth of Cornelius Creek lived a negro, known to the Indians as O-gah-gwaah, "the sun-fish".

Tga-non-da-ga-yoo-hah, "old village". This was the name given to a Seneca village of 1780, on the land owned by Henry Twichell, between Abbott Road and Cazenovia Creek, and west of Cazenovia Street.

Tga-is-da-no-yont, "place of the suspended bell" (Marshall) was the Seneca name for their mission house. This house was occupied by Rev. Asher Wright, and still stands on Buffum Street, opposite what once was the Seneca Cemetery.

Tgah-si-ya-deh, ''rope ferry'', over Buffalo Creek, presumably at the foot of Main Street.

Te-kise-da-ne-yont, ''place of the bell'', (Morgan) was the Seneca name for the group of cabins about the Church and Mission-house, on what is now Indian Church Road.

Yo-da-nyah-gwah, ''place for fishing with hook and line'', Sandy town on beach above Black Rock''. (Marshall).

Tos-e-o-way, a variant of ''Do-sho-weh'', ''the place of bass-woods'' or Buffalo Creek, appears on Joseph Ellicott's map of ''Part of the Buffalo Creek Reservation'', of 1804.

Te-ho-se-ro-ron, is a variant of above.

Ga-a-nun-deh-ta, Seneca name for Cazenovia Creek. (Morgan).

Erie—The Nation of that name, the Nation of the Cat.

Lake Erie—Do-sho-weh, ''the place of bass-wood'' (Morgan); Teicharontiong, (Coronelli); Lac du Chat, (Sanson); Lac-Erie, (Coronelli); O-swee-go, (1726); Sa-hi-quage, (1701); Cahiquage, Swee-ge, (1760); Te-cha-ron-ki-on (1671) a variant of Teicharontiong; ''Kau-ha-gwa-rah-ka, i. e. A Cap, now Erie'', (A. Cusick); ''Ga-noh-no-geh, place filled up, Long Point sometimes applied to Lake Erie'', (Beauchamp); Lac Conti; Gai-gwah-geh.

Indian Church Road—Street running from Seneca Street to Gardenville. It was so-named because beside it stood the mission church of Te-kise-ne-do-yont.

Seneca Street was at first the trail, then the road, to the Seneca town, Te-kise-ne-do-yont.

Red Jacket Parkway and Red Jacket Street were named from the Chief of that name, Sa-go-ye-wat-ha.

CHEEKTOWAGA.

Chic ta-wau-ga, now spelled Cheektowaga was Jiik do-waah geh "place of the crab-apple". (Morgan).

Cayuga Creek, from the Cayuga village of 1780. Its Seneca name was Ga-da-geh, "through the oak openings" (Morgan), or Gah dah-geh, "fishing with a scoop basket", (Marshall).

CLARENCE.

Tanun-no-ga-o, "full of hickory bark" was a name for Clarence.

COLLINS.

Ga-nun-da-sey, "newtown" Seneca name for the village of Newtown, west of Lawton's Station. (A. C. Parker).

Ga-nus-sus-geh, "place of the long house" the Seneca name for the council house square at Newtown, west of Lawton's Station.

EVANS.

Te-car-na-ga-ge, "black waters", was "Two Sisters' Creek". (Morgan). Probably Big Sister Creek.

GRAND ISLAND.

Ga-wah-no geh, "on the island", (Morgan) and Ga-we not, "great island" (Marshall) were names for Grand Island.

HAMBURG.

Gah-gwah-ge-ga-aah, "residence of the Kah-Kwahs" (Marshall), was the name for Eighteen Mile Creek. Gah-gwah ga (Morgan) and Gah-gwah-geh are variants. French in Gazetteer of State of New York calls it "Gaah-gwahge gu-aah"

Ka-e-oua-ge-gein, is Pouchot's name for Eighteen Mile Creek. Other names are Koughquaugu, Cangwa and Canquaga.

Ta-nun-no-ga-o, "full of hickory bark" (Morgan) was another name for the same creek.

LANCASTER.

De-as-gwah-da-ga-neh, "place of the lamper eel", was a name for Lancaster, derived from the name of a person who died there (Marshall).

Ga-squen-da-geh, "place of the lizard", Lancaster, (Morgan).

NEWSTEAD.

De-on-gote, "place of hearing", Murderer's Creek at Akron. This possibly refers to the sound of the Falls at Falkirk.

Se-un-gut, a form of above.

On-ta-ro-go, a place two and a half miles southwest of Akron.

WEST SENECA.

Da-deo-da-na-suk-to, "bend in the shore" (Morgan), was Smoke's Creek (mouth).

De-dyo-deh neh-sak-do, "gravel bend", (Marshall) was the shore above Smoke's Creek.

De-dyo-na-wah'h, "the ripple", Gardenville.

Dyos-hoh, "the sulphur spring" (Marshall). This was one locally called "Sulphur Springs", on Mineral Spring Road, near Buffalo Creek.

Dyo-nah-da-eeh, "hemlock elevation". This was a Seneca village of 1780, at Blossom, on the Elma township line.

Dyo-ge-oh-ja-en, "wet grass". This name was given to "Red Bridge". The bridge known locally as the "Red Bridge" was on the Orchard Park Road (Potter Road) where it crossed Cazenovia Creek, near Seneca Street. The name may refer to the growth of low flags on the sand bars in the creek at that point.

Ga-gah-doh-ga, "white oak creek" was "the north branch of Buffalo Creek, above Sulphur Springs". (Strong, quoted in Beauchamp). This must be Cayuga Creek.

Ga-ya-gua-doh, "smoke has disappeared", Smoke's Creek. Name of Old Smoke, a Seneca chief.

Ga-yah-gaawh-doh, (Marshall) same as above.

Hah-do-neh, "place of June berries" (Marshall) was "the Seneca Creek, or the south fork of Buffalo Creek". I do not know what is meant here.

He-yont-gat-hwat-hah, "picturesque spot", Cazenovia Creek, at the bluffs, on the Aurora Road, near Ebenezer.

I-o-si-o-ha, quoted from Pennsylvania Archives by Beauchamp, as being the name of the Onondaga village at Buffalo Creek. This village was at the ford, on the Potter Road. It seems to be a variant, however, of the Indian name of Buffalo, Do-syo-wa.

Kan-ha-i-ta-neek-ge, "place of many streams", (Cusick) is a variant of "Kanhaitauneekay", which D. Cusick said was "east of Onondaga village, Buffalo Reservation"

On-on-dah-ge-gah-geh, "place of the Onondagas" (Marshall) was the Onondaga village at the ford of Cazenovia Creek, on Potter Road and Seneca Street. Their cabins stretched from the "Red Bridge" to the ford, mostly on the terrace, and on Seneca Street, eastward towards Ebenezer. The Council House stood on the "flat" on the east side of the ford, close to the creek.

Sha-ga-nah-gah-geh, "place of the Stockbridges" (Marshall) was said to be the east end of Ebenezer. Nothing seems to be known about any settlement there of Stockbridge Indians.

Tga-des, "long prairie" was the name for meadows at Blossom, in West Seneca and Elma.

Tga-noh-so-doh, "place of houses" was the village at the forks of Smoke's Creek. Beauchamp says "in the forks", and it may have been there. More probably it was a little west of this (Site No. 73) and was perhaps the village of Smoke, who gave the creek its name.

Niagara County.

HARTLAND.

A-jo-yok-ta, "fishing creek", Johnson's Creek.

LEWISTON.

Duh-jih-heh-ah, "walking on all fours", (Marshall).

LEWISTON HEIGHTS.

Ga-a-no-geh, "on the mountain" (Morgan) the Tuscarora settlement on the "Mountain Ridge". Compare "Kienuka".

Gan-stran-yea, "bark laid down", (Elias Johnson) a name for Site No. 39.

Kienuka, "fort with a fine view" (Turner) is a name for Site No. 39. It seems quite probable that this well-known name is a variant of "Ga-a-no-geh, the name for the Tuscarora settlement, but E. Johnson translates "Kienuka", as simply "fort".

Tuscarora, the sixth nation of the Iroquois Confederacy, now on the Tuscarora Reservation on the "Mountain Ridge" in Lewiston.

LOCKPORT.

De-o do-sote, "the spring" (Morgan), Lockport.

De-o-na-ga-no, "the cold spring" (Morgan) is a little beyond Lockport.

Ta-ga-ote, "at the spring" (Morgan), Lockport.

NEWFANE.

Date-ge-a-de-ha-na-geh, "two creeks near together", (Morgan) is Eighteen Mile Creek.

NIAGARA.

A-qua-ra-ge, an abbreviated form of:

Ca-ha-qua-ra-ghe, "neck just under the chin", was applied to the Niagara river and perhaps to Niagara Falls. A possible variant of this, "Ca-hi-qua-ge was also applied to Lake Erie.

Cayuga (Creek), from the Iroquois Nation of that name.

Date-car-sko-sase, "highest falls", Niagara Falls, (Morgan).

Det-gah-skoh-ses, "place of the "high fall", Niagara Falls, (Marshall). Beauchamp says that neither form is exact.

Dyn-no-wa-da-se, "the current goes round", the Whirlpool. (Marshall).

Dyns-da-nyah-goh, "cleft rocks", the "Devil's Hole and Bloody Run (Marshall).

Ga-sko-sa-da, "falls" applied in general to Niagara Falls.

Kas-sko-so-wah-nah, "great falls", Niagara Falls.

Niagara, the best known form of the Indian name. Its Neuter name was "Onguiaahra"; Seneca, "Nyah-gaah" or "Neah-ga; Tuscarora, "Oneacais"; Cayuga, "Oneaga"; Oneida, "Oneagale"; Mohawk, "Oneagara".

Ondiara, on a map of 1665, at the mouth of the Niagara River, is perhaps a variant of "Ongiara", or Niagara.

PORTER.

O-yon-wa-yea, O-non-wa-yea, mouth of Four Mile Creek.

O-yong-wong-yeh, Onondaga name for above.

ROYALTON.

O-ge-a-wa-te-ka-e, "place of the butternut", Royalton Center, (Morgan).

Te-ka-on-do-duk, "place with a signpost", Middleport.

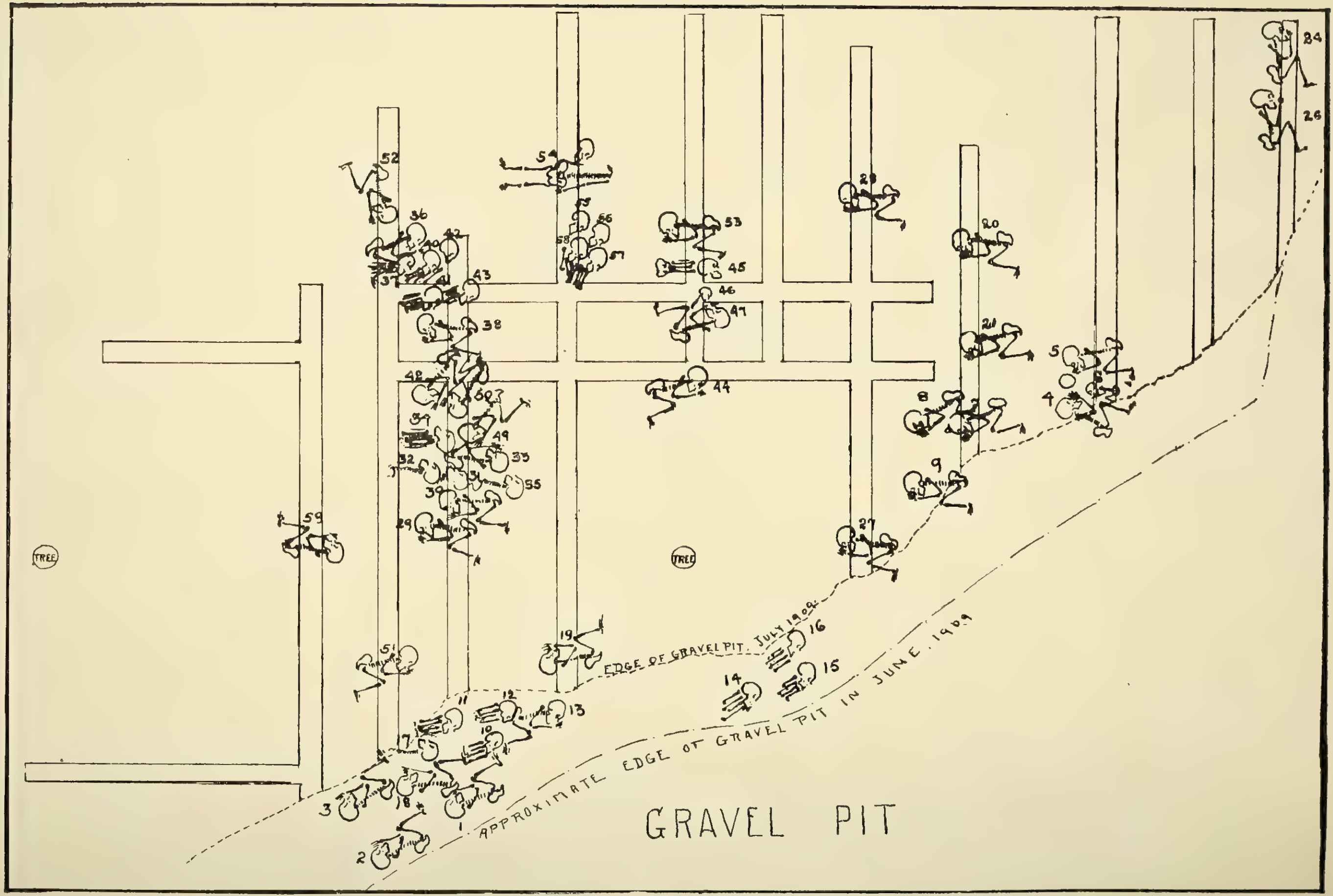
SOMERSET.

Hate-keh-neet-ga-on-da, Golden Hill Creek, (Morgan).

WHEATFIELD.

Gwa-u-gwah, "taking canoe out", Seneca village at the mouth of Tonawanda Creek, (Morgan).

Ni-ga-we-nah-a-ah, "small island", Tonawanda Island.
Lake Ontario, "Skanadario", "the beautiful lake".



NEUTER CEMETERY ON GRAND ISLAND.

Report on Neuter Cemetery
Grand Island, N. Y.

EXCAVATED FOR THE
BUFFALO SOCIETY OF NATURAL SCIENCES
By FREDERICK HOUGHTON

July 27, 1909.

Mr. Henry R. Howland, Superintendent,
Buffalo Society of Natural Sciences.

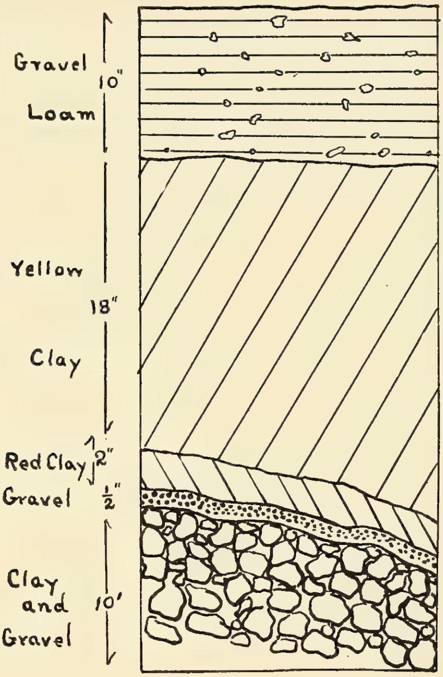
Dear Sir:—

I take pleasure in submitting this, a report of my archaeologic field work during June and July.

Early in June I learned of the discovery of Indian remains at the lower end of Grand Island. Investigation showed that it was a large cemetery and worth excavating. Accordingly work was at once begun and has now been satisfactorily completed.

The cemetery was the burial place of the village marked No. 30 on my map. It is situated on a farm occupied by John Van Son and owned by Mr. Hoffeld of this city. It is on a low knoll, 1/4 mile north of the Long Road and 1/4 mile east of Niagara River. The village seems to have been on the river bank opposite the middle of the "pulp boom", at a point well marked by refuse heaps, though they are now hidden by a growth of sweet clover. The knoll in which the cemetery is, was also occupied by the village at one time, for the surface above the graves and to the eastward of the burial place is littered with potsherds, animal bones and charcoal, the remains of refuse heaps. Many graves are covered with an undisturbed layer of midden earth, showing that the knoll was occupied after the burials took place. That these middens are not recent is shown by the occurrence in them of pottery and flint points.

The knoll in which the cemetery occurred is composed of coarse gravel, and it was while excavating this gravel for use as road-metal that the first graves were found. The gravel is covered with a layer of clay and gravelly loam, which varies in thickness from a few inches to forty inches at its greatest depth. At most points it is about thirty inches thick. Covering the entire gravel deposit and separating it from the loamy top soil is a thin but well defined stratum of fine gravel, and on this layer, most of the skeletons were found. Above this, and forming the bottom layer of the soil is a layer of tough red clay, varying in thickness from a mere streak to ten inches. Above this is a layer of yellow clay, topped by gravelly loam in a good state of cultivation. The section shows these strata. Nearly all the graves penetrated the loam, the yellow clay and the red clay and reached as far as the fine gravel. Accordingly the depth of the graves varied with the thickness of the upper layers, from 30 inches to 44 inches.



On my first visit I found that the top soil of the southern and eastern sides of the cemetery had been removed with plow and scrapers, exposing the gravel which had then been removed for use as road-metal. A deep pit had been excavated, roughly crescent in shape, convex to the southeastward. The removal of the top soil had exposed graves on the eastern and southern edges of the cemetery. Since my first visit more of the gravel has been removed, and the area of the cemetery has been still farther encroached upon. Eventually the entire knoll will be removed.

During the month of June some desultory work was done by Mr. William L. Bryant, Dr. Robert E. DeCeu and myself, and 28 bodies were exhumed. Beginning July 8th, I worked systematically until July 24th, and exhumed 31 more skeletons. These I have reburied in a pit nearby.

For the most part the work was done by trenching the surface. The trenches began at the face of the gravel pit and at intervals of about a yard, ran straight north until beyond the probable limits of burial. A few of these were intersected by trenches running E. and W. These trenches penetrated to the layer of fine gravel.

In the beginning the rapid excavations in the gravel pit made it necessary to explore along the edge of the pit by caving off the surface instead of trenching. Three apple trees (which I was not allowed to remove) made it necessary to leave untouched three areas, at least ten feet across.

On the plan appended the trenches are shown.

When the skeletons were found, I uncovered them with a whisk broom, and the exact position, not only of every skeleton but of many articles buried with it, was noted.

Three methods of burial were found to have been practiced. Skeletons were found in a flexed position, in bundles, and one was found extended. No special orientation was observable.

Of the 59 bodies exhumed, 41 were buried in a flexed position. A body so buried was evidently prepared immediately after death by having the knees drawn up tightly to the body, the arms bent at the elbows which were drawn tightly to the sides, and the hands were extended before the face. In some the fingers were extended, in others the hands were clenched. The body so drawn up, was laid on its side in the grave, with such articles, as were to be buried with it. In many cases stones were heaped above the body and the grave was then filled in.

Of the 59 burials, 16 skeletons were in the form of bundles of bones. These "bundle burials" varied in character. A typical bundle No. 12, consisted of the long bones of the arms and legs, lying parallel, beneath which were the smaller bones, the ribs, vertebrae, hand and foot bones, etc. At the eastern end of the bundle was the skull. No. 38 was a jumble of bones, with the skull at one end. No. 37 was an indiscriminate mass of bones probably of several skeletons with two skulls. Nos. 55, 56, 57 and 58 were four skeletons arranged in a mass. The four skulls lacking the lower jaws, were placed side by side. The other bones of the skeletons had evidently been placed in four packages on the southern side of the skulls and touching them. Most of the long bones were parallel or nearly so. The pelvic bones, however, and the lower jaws were not in any seeming order. The leg and foot bones of two of the skeletons were in position, showing that the skeletons were partly intact when buried.

Few articles accompanied these "bundle" burials. Of 16 so buried 4 had articles buried with them.

But one skeleton, that of an adult, was found in an extended position. It lay approximately E. and W. All the bones excepting the skull and the right arm were in position. Of these the humerus lay six inches above the lumbar vertebrae, crossing them. The remaining bones of the right arm and hand were in position at the side of the body. The lower jaw covered the cervical vertebrae. The skull was on the right side of the body, opposite the dorsal vertebrae, 12 inches to the right and 6 inches above them.

The bodies buried in the flexed position seem to have been those from the village, and it was evidently designed that such burials should be permanent.

The bundles of bones are skeletons of persons who were buried temporarily, or allowed to lie above ground, until the flesh had decomposed. After decomposition, the bones were gathered, made into a bundle, and buried permanently in this cemetery. In one case at least, a bundle of bones was buried after the burial of a flexed body. No. 36 was lying in the usual flexed position, all bones being in position, while No. 37 was a bundle, the skull of which lay in contact with the vertebrae of No. 36, and the bones of which mingled with the leg bones of No. 36.

The presence of charcoal and ashes in some graves, and the occurrence above them of midden earth, makes it seem probable that these bodies were buried under the floors of cabins or lodges. This might easily occur during winter when digging in the hard frozen earth was impossible.

No custom seems to have prevailed regarding the burial of articles with the bodies. A summary of articles found follows:

Total number of bodies exhumed	59
Buried without articles	28
Buried with articles	31
Buried with articles of personal adornment	21
“ “ “ “ use	21
“ “ European articles	20
“ “ Iron axes	2
“ “ Awls	4
“ “ Knives	8
“ “ Brass Kettles	2
“ “ Glass Beads	11
Buried without any European articles	11
Buried with Stone articles	4
“ “ Shell	16
“ “ Articles of Clay	17
“ “ Clay pipes	10
“ “ “ pottery	7
“ “ Animal remains	10

The knoll occupied by the cemetery is said to have been originally covered with a heavy walnut growth. This was cut off, and a peach orchard was planted there. This was followed by the present apple orchard.

Mr. Bryant learned from a man working on the farm that his grandfather remembered Indians camping on the river bank, at the point where a dry brook now is. He states that this brook then contained sufficient water to allow canoes to be drawn up into it. He also claims to have found a leather quiver filled with arrows, the wood of the shafts being still attached to the points.

A farmer, George Long, on the next farm, "The Poplars", has a good shell gorget and a very large shell pendant taken from a grave here.

A detailed list of the graves and their contents is appended.

FREDERICK HOUGHTON.

Grave No.	Position	Character	Articles
1. Adult,		Flexed	Nothing.
2. Adult,	Head W. Face N.	"	Beads, effigy pipe at back of skull.
3. Adult,	" W. " ?	"	Nothing.
4. Adult,	" N.W. " N. E.	"	Brass kettle between skulls Nos. 4 and 5. Pipe, Beads.
5. Adult,	" S.W. " S. E.	"	Pipe, Iron Axe, Iron Knife.
6. Child,	" W. " S.	"	Beads and Pendant.
7. Adult,	" W. " S.	"	Pipe, Knife.
8. Adult,	" W. " S.	"	Pipe, 2 knives, beads.
9. Adult,	? ?	"	Nothing.
10. Adult,		Bundle	Nothing.
11. Child,		Flexed	Nothing
12. Child,		Bundle	Broken jar, glass beads
13. Child,		Flexed	Shell beads.
14. Adult,		Bundle	Clay jar.
15. Adult,		"	Nothing.
16. Adult,		"	Nothing.
17. Child,	Head E. Face S.	Probably flexed	Clay jar, 4 long bone tubes.
18. Adult and Child		Flexed	Bird's skull.

Grave No.	Position	Character	Articles
19. Adult,	Head W. Face N.	Flexed	Brass kettle, back of pelvis, 3 pipes, iron knife, 2 iron awls, 1 scraper, 1 flint, 1 pc. iron pyrites, 1 comb, shell beads, beaver teeth, bear teeth, 2 animal skulls, iron axe.
20. Adult,	(?)	Flexed	Nothing.
21. Adult,	Head W. Face S. (probably)	"	2 stone points from sacrum, iron awl, Jesuit ring, bracelet, wampum, hawk bill, paint stone.
22. Adult,		Flexed	Glass beads, large shell bead, broken pottery.
23. Adult,		"	Nothing.
24. Adult,	Head W. Face E. (probably)	"	Comb, pipe.
25. Adult,	Head (?) Face E.		Nothing.
26. Adult,	Head N. Face E. (probably)	"	10 brass points, 2 stone points.
27. Adult,	Head W. Face S.	"	Comb, pipe, beads, shell pendant, 3 large red beads, knife, eagle bill, wolf jaw, red bead.
28. Adult,	Head W. Face S.	"	Nothing.
29. Young adult,	Head W. Face S.	"	Wampum, glass beads, brass beads.
30. Adult,	Head W. Face S.	"	Nothing.
31. Child,	Decayed,	Probably flexed	Nothing.
32. Child,	"	"	Glass beads, knife, bear's jaw.

Grave No.	Position	Character	Articles
33. Child, much decayed,		Flexed	Broken clay jar.
34. Adult,		Bundle	Nothing.
35. Child, decayed		Probably flexed	Glass beads, shell beads iron knife.
36. Adult,	Head E. Face S.	Flexed	Nothing.
37. Adult,		Bundle	Nothing.
38. Young adult,	Head W. Face S.	"	Broken clay jar.
39. Child, much decayed,		Probably flexed	Brass coiled spring at pelvis.
40. Adult,		Bundle	Nothing.
41. Child, much decayed,		Probably bundle	Blue glass beads.
42. Adult,		Bundle	Nothing.
43. Adult,		"	1 stone point, 1 bear's claw.
44. Adult,	Head E. Face S.	Flexed	Clay pipe at hand in front of jaw, iron knife and awl in right hand.
45. Child,		Bundle	Nothing.
46. Child, (across head of No. 47)		Flexed	Beads.
47. Adult,	Head N. Face W.	"	Glass and shell beads mixed with beads of No. 46.
48. Young adult,	Head S. Face E.	"	Glass beads, shell beads fish vertebra.
49. Child, much decayed,		Probably flexed	Nothing.
50. Adult,	Head S. Face E.	Flexed	Nothing.
51. Adult,	Head E. Face S.	"	Clay jar behind pelvis, broken clay jar above body.

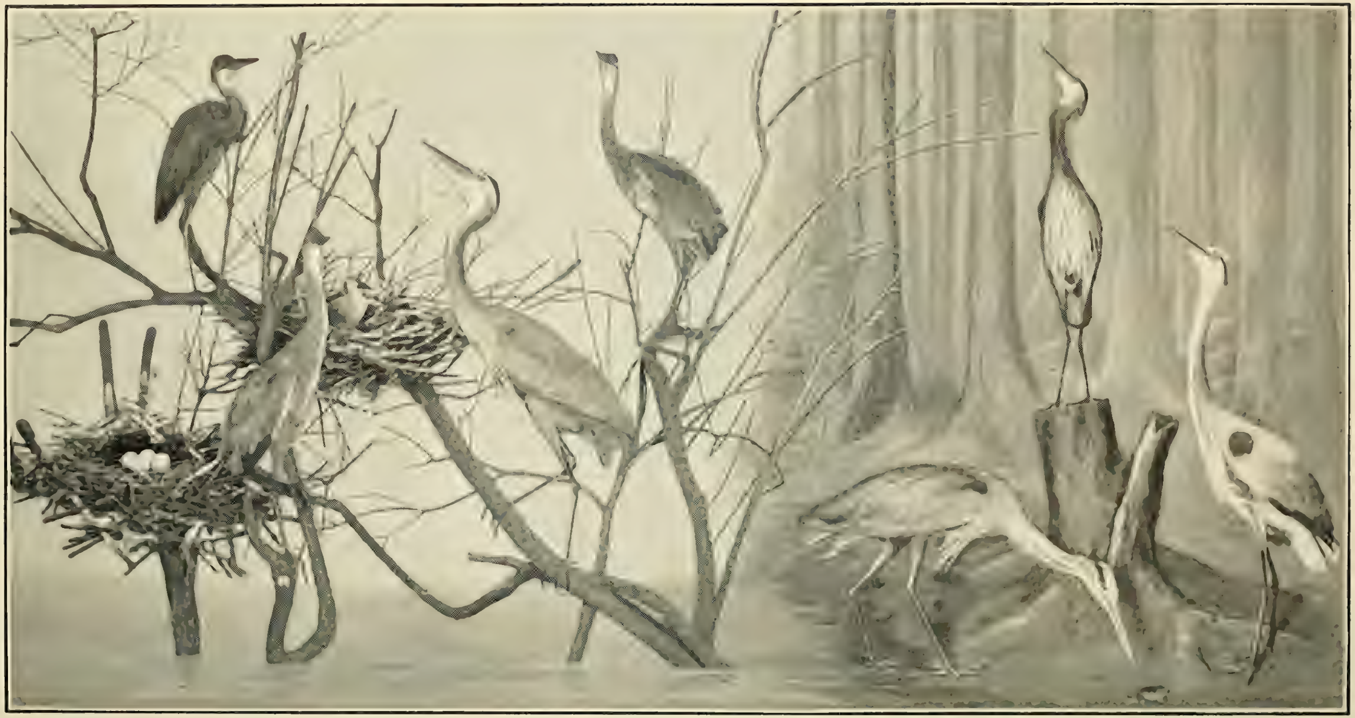
Grave No.	Position	Character	Articles
52. Young adult,	Head S. Face W.	"	Nothing.
53. Adult,	Head W. Face S.	"	Nothing—Refuse heap at depth of 15 in. above grave.
54. Adult,	Head E.	At full length, Lower jaw on end of cervical vertebra. Skull 12" W. of Dorsal vertebra and 4" higher, upside down. Right humerus removed and lying across vertebra, 4" above it, fingers of both hands on pelvis.	Pipe at left elbow. Shell gorget on lumbar vertebra, concave side up. 2 blue beads at neck.
55. Adult,		Bundle, 4 leg & foot bones in position. All others mixed.	Nothing.
56. Adult,			
57. Adult,			
58. Adult,			
59. Adult,	Head E. Face N.	Flexed	Shell beads along right arm, clay pipe, iron knife and iron awl at right elbow.

Cache of red ochre on southern side of grave pit.

FROM REFUSE HEAPS.

From above No. 44, Clam shell with large perforation.
" " " 53, Earth mixed with charcoal and ashes. Broken animal bones.
" " " 47, 1 flint point.

From refuse heaps on east side of grave pit, 1 piece turtle carapace, perforated.



GROUP OF GREAT BLUE HERONS. BUFFALO SOCIETY OF NATURAL SCIENCES.

The Great Blue Heron

in New York State.

Its Threatened Destruction.

In the Bulletin of this Society in December, 1908, (Vol. IX, No. 1) was published an illustrated article by Mr. Ottomar Reinecke upon the Great Blue Heron (Ardea Herodias) in the State of New York calling public attention to the unfortunate fact that, while forty years ago there were four colonies of these birds within a radius of fifty miles from Buffalo, three of these had become extinct, and the fourth threatened with destruction.

At present the only heronry in Western New York is that so interestingly described in Mr. Reinecke's article, located on an island in what is called the Tonawanda Swamp at a point about fifty miles northeast of Buffalo in the township of Elba about half a mile south of the boundary line between Orleans and Genesee Counties. The swamp extends for many miles, its outlet being Oak Orchard Creek. but the territory occupied by the birds is not of very large extent, being from one to four miles in width. This heron colony now contains about one hundred nests and if undisturbed the number would undoubtedly increase. A movement has been on foot for two years to make the Tonawanda Swamp a forest preserve, the first effort in that interest in Western New York. This swamp district is not malarial and in it Oak Orchard Creek and Tonawanda Creek have their source and both of these streams would dry up if their sources are not preserved.

But especially should public interest be awakened in the endeavor that is being made to at least preserve this last one of our great heronries. This is the only remaining nesting place of these beautiful and remarkable birds within the borders of our Empire State. Within the period of a single generation all the others have been destroyed and these great birds driven away to remoter and less disturbed regions.

Here is an opportunity for the State to do something in the interest of Natural Science, which at the same time is in the direct line of the interests of the people in connection with forest preservation and the protection of our too rapidly diminishing natural water supplies and the preservation thereby of our already too scanty forest regions. It is urged upon all who are lovers of birds, upon the Audubon Societies who are so warmly concerned in their protection and upon all similar organizations that an earnest and united effort be made to bring about such legislative action as may lead to the preservation of this heronry and the protection of this last survival of the Great Blue Heron in Western New York. Now is the time to act to accomplish that result.

Monograph of genus Crophius Stal.

By Edward P. Van Duzee.

The following study of the Hemipterous genus *Crophius* is based upon the material in my own collection, a fine series received from Mr. Otto Heidemann and from the National Museum, and a few California specimens from the Cornell University collection. I am under special obligations to Mr. Heidemann whose exceptionally fine series added three species before unknown to me. He has also compared for me specimens of *scabrosus* with Dr. Uhler's type and thus settled the identity of the species which I could not have done from the published description alone. Dr. Distant has been so good as to compare the same species with the type of his *Mayana costata* from Mexico and has pronounced them distinct although closely allied species. *Mayana costata* and *scabrosus* are not characteristic of genus *Crophius* and I have felt much inclined to retain *Mayana* as a distinct genus, but if we do this we must also separate *angustatus* which is even more distinct, so it seems best on the whole to list them all in the old genus *Crophius* placing *Mayana* as a synonym as Dr. Berg has already done with his genus *Aneurophorus*

This genus is largely western in its distribution. Our only eastern species, *disconotus*, has been taken but rarely by me and I have seen but few examples in other collections. It may perhaps be found in numbers in certain favorable locations as has already been done in the case of at least two of our other species. Mr. J. C. Bradley took *scabrosus* in great numbers at Milford, Utah, on small juniper trees and Mr. Heidemann writes me that Messrs. Barber and Schwarz found *Schwarzi* in great numbers in the folds of a window curtain at Hot Springs, Arizona.

The food plants of our native species of *Crophius* excepting *disconotus* seem to be unknown; that species I have taken on three different occasions and always on the golden rod which seems to be its natural habitat.

Crophius leucocnemis Berg from Argentina and *costata* and *dirupta* Distant from Mexico and Guatemala are unknown to me and are not included here. This paper therefore deals only with the species from north of Mexico.

CHARACTERS OF GENUS CROPHIUS.

Form obovate, widest behind; head and thorax punctured, the punctures coarser on the pronotum. Head convex, excluding the eyes as wide as the front of the pronotum; sides parallel before the eyes; antenniferous processes broad, armed with a minute tooth exteriorly; tylus broad triangular, truncated at apex, viewed from the side regularly arcuated; bucculæ prominent anteriorly, more slenderly reaching to near the base of the head. Rostrum reaching to about the middle of the mesosternum, first joint nearly attaining the anterior line of the eyes, second slightly surpassing the base of the head. Antennæ moderately stout, first joint equalling or generally surpassing the tip of the tylus; second much longer and more slender; third usually a little thicker than the second and about equal to the first in length; fourth stout, fusiforn, usually as long as the second or even longer.

Pronotum trapezoidal, moderately convex, feebly constricted at about the middle; anterior margin about two thirds the length of the posterior; callousities usually distinct. Prosternum without a sulcus; meso– and metasternum distinctly sulcate; the metasternal sulcus sometimes much broadened or almost obsolete. Hind edge of the metapleura developed in a rounded lobe or flap either side. Scutellum equilateral or nearly so, impressed near the base; the base much raised and usually covered by the hind edge of the pronotum; the apex with a distinct carina.

Elytra usually exceeding the abdomen, feebly convex; broadest near the apex of the corium; coarsely and sparsely punctured; costa more or less expanded, its margin nearly rectilinear; clavus with three fairly regular rows of punctures, those of the sutural row finer; corium with prominent nervures, the punctures scarcely forming lines; costal margin usually impunctate; membrane broadly rounded, the four nervures distinct and nearly straight. Anterior femora moderately incrassated; unispinose, sometimes with a few small teeth near the apex.

This genus is very close to *Oxycarenus* but in the latter the rostrum is longer, attaining the base of the abdomen, and the prosternum is sulcate.

Type: *Lygæus disconotus* Say.

KEY TO THE SPECIES OF CROPHIUS.

Rostrum long, reaching to the middle of the metasternum; cinerous, fusco-punctate; pronotum short, 7, *scabrosus* Uhler.

Rostrum shorter, not attaining the base of the mesosternum, 1

1. Anterior margin of the pronotum concolorous or nearly so, 2

–. Anterior margin of the pronotum with a distinct pale collar, 4

2. Legs ferruginous or rufo-ferruginous, unicolorous; elytra whitish, fusco-punctate; disk of the membrane and discal nervures of the corium fuscous, *1*, *disconotus* Say

–. Femora piceous except at tip; membrane infuscated, the apical margin broadly pellucid, 3

3. Clavus and corium cream-white, immaculate; pellucid margin of the membrane dotted, *3*, *Heidemanni* n. sp.

–. Clavus and broad apex of the corium black; basal angle of the membrane with a white spot, *2*, *Schwarzi* n. sp.

4. Head piceous or black; femora infuscated or black, at least above, 5

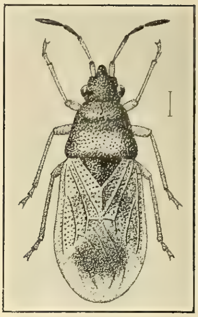
–. Head and legs ferruginous, concolorous, *5*, *angustatus* n. sp.

5. Pronotum black, sometimes shading to ferruginous brown posteriorly; anterior margin abruptly whiter; hind edge obscurely paler, at least on the middle, *4*, *Bohemani* Stal

–. Pronotum ferruginous brown, with a black band across the callousities and five obscure pale vittæ posteriorly; the posterior lobe distinctly impressed on the middle and before each humeral angle; anterior margin paler, becoming whitish at the median line, *6*, *impressus* n. sp.

1. Crophius disconotus Say.

Complete Writings vol. i, page 330.

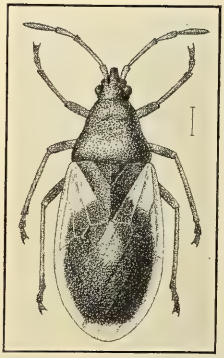


Head, anterior lobe of the pronotum and scutellum black; posterior lobe of the pronotum sometimes tinged with testaceous or ferruginous. Antennæ and legs ferruginous; third and fourth antennal joints black, the extreme base and apex of the second sometimes infuscated; tibiæ, except at base and apex, whitish; tip of the tarsi infuscated; rostrum, coxæ and edges of their sockets dark ferruginous; metapleura with a large opaque rastrate area about the orifices; posterior flap broadly whitish. Abdomen piceous brown, polished. Elytra soiled white, with sparse large, mostly fuscous punctures; the corium very obscurely infuscated from near the base, darker on the nervures; large disk of the membrane infuscated or almost black as seen against the tergum, its nervures darker. Length 3–3 3/4 mm.

In its structural characters this species is considered typical and does not vary from the generic diagnosis given above.

Type locality Missouri. I have taken this species in New York and Pennsylvania, Mr. G. M. Moore has found it at Montreal and Mr. Heidemann has specimens from Washington, D. C., and Banff Springs, Alabama. Dr. Uhler records it from Utah, California and Lower California.

2. Crophius Schwarzi n. sp.

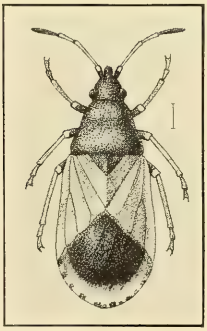


Basal joint of the antennæ surpassing the tip of the tylus by about one third its length; fourth a little shorter than the second. Metasternum somewhat depressed at base but hardly sulcate; callousities quite strongly elevated, almost impunctate, together forming a sinuated ridge across the middle of the pronotum. Claval lines of punctures somewhat confused. Membrane very large; its inner nervure almost obsolete. Length 3 1/2–4 mm.

Color deep black, sometimes tinged with ferruginous on the base and apex of the pronotum toward the median line. Elytra white, the clavus and broad apex of the corium as far as the costal area piceous; large disk of the membrane piceous black omitting a white spot or ray at the basal angle. Venter piceous, polished. Posterior flap of the metapleura scarcely paler. Basal two joints of the antennæ dark ferruginous, the tip of the second infuscated; third and fourth black. Legs dark ferruginous, the intermediate and posterior femora piceous except at apex; tibiæ with the usual pale annulus covering most of their length.

Described from three female examples taken at Hot Springs, Arizona, by Mr. E. A. Schwarz and kindly sent to me for study by Mr. Heidemann bearing the MS name here employed, and seven examples from the National Museum taken on June 22d at the same locality by Messrs. Barber and Schwarz. This is a very pretty species a little larger and more clearly marked than *disconotus* from which it may readily be distinguished by the black clavus and apex of the corium.

3. Crophius Heidemanni n. sp.



General aspect of the preceding but with the clavus and corium entirely pale. Antennæ slender; basal joint scarcely surpassing the tip of the tylus; second long; fourth but little thickened, slightly longer than the third. Callousities little elevated, punctured like the adjacent surface; anterior half of the metasternum deeply sulcate; tooth of the anterior femora apparently obsolete. Elytra minutely and obscurely punctured, these punctures concolorous and scarcely arranged in lines on the clavus. Length 3 1/2 mm.

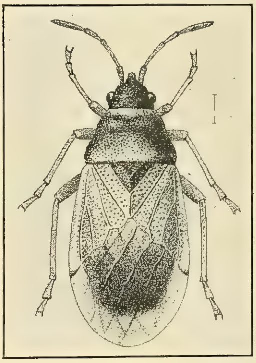
Color deep piceous black with slight bronze reflections; median line and humeral angles of the pronotum touched with ferruginous; second and third antennal joints fulvous. Elytra soiled white, immaculate; the membrane deep smoky brown with a pale apical border along the outer margin of which is a row of fuscous points; femora piceous black, their apex and the tibiæ and tarsi yellowish. Venter piceous black, polished.

Described from one female taken on the Santa Rita Mts., Arizona, by Mr. H. S. Barber and sent me for study by Mr. Heidemann and one pair taken at the same locality by Mr. E. A. Schwarz and received from the National Museum. This is a very distinct little species differing from our other known forms by the slender antennæ with short basal joint, the finely and obscurely punctured elytra, and in having the clavus and corium immaculate, whitish.

4. Crophius Bohemani Stal.

Fregatta Eugenies Resa, Hemiptera, p. 251, 1859, (Cymus).

Larger and broader posteriorly than in the allied species. Antennæ stout; basal joint a little surpassing the tylus; apical rather longer than the second, about twice the length of the third. Rostrum attaining the base of the metasternum. Bucculæ ending abruptly some distance from the base of the head. Pronotum longer than in the typical *disconotus;* very feebly constricted; the callousities but slightly elevated. Elytra ample, almost flat, coarsely punctured, the clavus with a few irregular punctures between the submarginal rows, scarcely forming a third row. Length 4 mm.

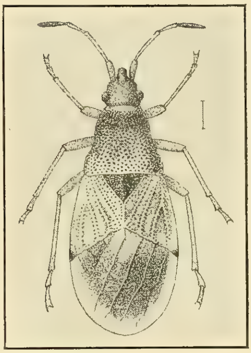


Color: Head, a pronotal band across the callousities, scutellum, and the meso- and metasternum and pleuræ black. Anterior margin of the prothorax whitish, posterior lobe of the pronotum piceous brown, becoming paler behind on the median line. Elytra soiled white, slightly infuscated across the middle of the corium, accentuated on the nervures there; membrane paler on the base and around the apical border, the nervures darker, Legs piceous brown; coxæ, knees, tibiæ and tarsi, except at apex, pale yellowish; tibiæ broadly annulate with pale. Venter piceous brown, polished. Antennae dark brown, apex of the first joint and the second except at tip, pale fulvous, the first sometimes almost entirely ferruginous.

Type locality California. Before me I have examples from Idaho, Utah, Oregon, Vancouver Island and Palo Alto and Santa Cruz Beach, Calif.

This species seems to be somewhat variable but I feel no doubt of its identity. Stal seems to have described it from a deeply colored specimen but most of those I have before me are paler as described above. In the National Museum is one having the femora except at apex, and the basal joint of the antennæ piceous black.

5. Crophius angustatus n. sp.



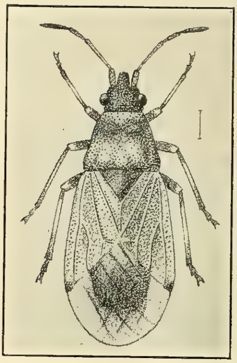
First antennal joint much exceeding the tip of the tylus; fourth scarcely as long as the second. Pronotum unusually narrow, subconical, callousities prominent, finely punctured, scarcely connected. Scutellum large. Elytra short, corium about the length of the membrane, the truncated apical margin but slightly oblique; nervures strong, forming one costal and three discal areoles, each bounded by a line of fine punctures; clavus with a few punctures forming three imperfect lines. Membrane ample, attaining the apex of the abdomen, the nervures prominent. Anterior femora unarmed. Metasternum without a distinct sulcus. Length 3-3 1/2.

Color: Head and antennæ ferruginous, the apical joint of the latter black. Pronotum testaceous, shading to ferruginous across the callousities and toward the humeri; the surface coarsely fusco-punctate. Anterior and very narrow posterior margins pallid, almost smooth; disk of the callousities and the scutellum piceous black. Elytra soiled white, the strong pale nervures bordered by lines of fuscous punctures. Disk of the membrane enfumed, the nervures brown, basal and apical margins broadly pale. Legs ferruginous, the tibiæ with the usual broad pale annulus. Pectus piceous, the coxal insertions and posterior flap of the metapleura whitish, Venter piceous, polished, becoming ferruginous on the disk.

Described from fifteen examples representing both sexes. Four of these were taken at Los Angeles, Calif. by Mr. C. W. Coquilette, the others were captured at Utah Lake, Utah, in June.

This species is very distinct by its narrower form becoming much widened behind, the almost truncated apex of the corium, unarmed anterior femora and the paler ferruginous colors.

6. Crophius impressus n. sp.



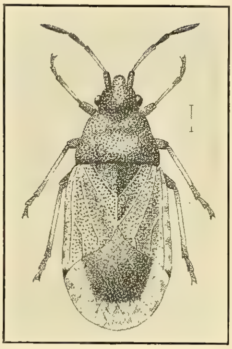
Pronotum rather convex, impressed on either side before the humeri and less distinctly on the disk of the posterior lobe. Callousities conspicuous, scarcely coalescent, almost impunctate. Antennæ normal except that the first joint is unusually long and thick, considerably exceeding the tylus. Scutellum small. Elytra sparsely punctured, the second row on the clavus broken or wanting altogether. Metasternal sulcus apparently absent. Length 3 1/2 mm.

Color: Head, callousities and scutellum black or nearly so; the former a little ferruginous on the tylus; antennæ ferruginous, the apical two joints fuscous. Pronotum ferruginous, punctured with fuscous, with the anterior border and five rays on the posterior lobe pale; the region of the callousities black. Beneath dark ferruginous or blackish; the coxal insertions and metapleural flaps conspicuously pale. Elytra soiled white, fusco-punctate, nervures usually pale; tip of the corium blackish; costal area with a few fuscous punctures. Membrane with a fuscous discal cloud which is faintly produced to the apex; its base whitish and the lateral margins pellucid; nervures mostly infuscated. Femora piceous; their base and apex and the tibiæ and tarsi ferruginous; the tibiæ with the usual broad pale annulus. Venter piceous, polished.

Described from one pair received from the Cornell University Collection and taken in Humboldt Co., Calif., by Mr. J. C. Bradley; the male at Blue Lake, June 20th, and the female at Pepperwood, Eel River, on June 28th. This species may be known by its pale variegated pronotum, punctate costal area of the elytra, pale coxal areas, large apical field of the scutellum, the conspicuous black point of the corium and the dark feet and antennæ.

7. Crophius scabrosus Uhler.

Oxycarenus scabrosus Uhler, Proc. U. S. Nat. Mus. xxvii, p. 353, 1904.



Aspect of *Mayana costata* Dist. Head short; basal joint of the antennæ short and thick, surpassing the tylus by one third of its length; third joint about two thirds the length of the second and fourth. Bucculæ little elevated. Rostrum attaining the base of the metasternum, which is scarcely sulcate. Pronotum short and broad, scarcely constricted; callousities inconspicuous and with the anterior lobe of the pronotum, finely punctured. Elytra less widened posteriorly than in our other species, corium coarsely irregularly punctured between the stout nervures; membrane much exceeding the abdomen. Length 3-1/2 mm.

Color: Head, scutellum and pectus in part piceous black; longitudinal disk of the head ferruginous. Pronotum testaceous grey; coarsely fusco-punctate, the punctures becoming finer anteriorly, the region of the callousities and sometimes a round area before the humeri darker; apical carina of the scutellum pale. Elytra cinerous; the nervures embrowned and marked with black where they join the apical margin; tips of the clavus and corium black; membrane without the dark discal cloud but a little paler along either side, the nervures infuscated; disk of the areoles dotted and varied with fuscous. Legs piceous black, knees and base of the tarsi ferruginous, tibiæ with a broad white annulus; insertion of the coxæ and posterior flap of the metapleura whitish; abdomen piceous black, opaque.

Type locality New Mexico. Of this species I have a long series taken at Milford, Utah, by Mr. J. C. Bradley and I took it myself at Ft. Collins and Manitou, Colorado; Mr. Heidemann has specimens from Colorado and Utah and in the National Museum is one from War Bonnet, Nebraska. Mr. Bradley's specimens were beaten from small juniper trees growing among the sage-brush on the plains at the mouth of City Creek Canon near Milford. He has kindly sent me a photograph of this collecting ground, reproduced below, showing one of the junipers in the fore ground and others in the distance.

This species is congeneric and very close to the insect described and figured in the Biologia Centrali Americana as *Mayana costata* Distant; (Heteroptera vol. i, p. 388, pl. 34, fig. 13, 1893.) but Mr. Distant has very kindly compared specimens with his type and pronounces them distinct. In *scabrosus* the rostrum is longer than in our other species, the pronotum is shorter and broader and the general appearance of the insect is somewhat different from *Crophius*, but I can find no characters which I would call of generic value. It really differs less generically from *disconotus* than does *angustatus*.

Characteristic sage-brush plain at mouth of City Creek Canon, Utah, showing juniper tree on which Crophius scabrosus was found.

A List of the Van Duzee Collection of Florida Beetles.

By H. F. Wickham.

Through the kindness of Mr. E. P. Van Duzee, I have received a considerable series of Coleoptera collected by him on a recent trip to Florida. While that state has been worked by coleopterists of great skill and their reports are of the highest value, future studies of the derivation and relationships of the faunæ of the various portions of the state will require the collation of a vast number of records before definite results can be reached. The material in my hands represents a goodly fraction of the spring fauna of the localities visited, and contains so many interesting species that the publication of a list seems desirable. A catalogue of the Hemiptera secured has already been printed by Mr. Van Duzee in a recent number of this Bulletin, so that it seems unnecessary to repeat here the remarks upon local conditions of the places visited, as they are set out in sufficient detail in that article. It will be noted that a very considerable proportion of the beetles enumerated below are phytophagous in habit or belong to groups preying upon plant-feeding insects, and they were undoubtedly taken principally by beating or sweeping herbage.

In recording the localities, the following system of abbreviation has been adopted:

C. Crescent City, April 19th to 25th.
Sf. Sandford, April 25th to 27th.
P. St. Petersburg, April 28th.
S. Sevenoaks, April 29th to May 2d.
T. Tampa, May 2d to May 3d.
M. Fort Myers, May 5th.
E. Estero, May 6th to May 13th.

CINCINDELIDÆ.

Cincindela dorsalis
    var. media Lec. S.
    marginata Fabr. E.S.P.
Cincindela tortuosa Dej. M. E.
    scabrosa Schaupp. E.

CARABIDÆ.

Scarites subterraneus
var. californicus Lec. C.
Tachys albipes Lec. C.
Evarthrus americanus Dej. S.
Loxandrus agilis Dej. E.
Platynus californicus
var. floridanus Lec. C.
Galerita lecontei Dej. T.
Lebia tricolor Say. C.
marginicollis Dej. E. M.
Lebia viridis Say. M. Sf.
Callida viridipennis Say. M. C.
decora Fabr. C. E.
fulgida Dej. E.
Plochionus timidus Hald. M.E.
Brachynus lateralis Dej. C.
Selenophorus palliatus Fabr. T.
Anisodactylus rusticus
var. merula Germ. E.

DYTISCIDÆ.

Thermonectes basilaris Harr. T.

HYDROPHILIDÆ.

Tropisternus glaber Hbst. E.
striolatus Lec. T.

STAPHYLINIDÆ.

Aleochara bimaculata Grav. P.
Stenus sp. C.

COCCINELLIDÆ.

Cycloneda sanguinea var. immaculata Fabr. C.
Olla sobrina Csy. T.
Psyllobora 20-maculata var. parvinotata Csy. M.
Chilocorus bivulnerus Muls. C.
Axion tripustulatum DeG. E.
Exochomus childreni Muls. T. C. M.
Exochomus latiusculus Csy. E.
Brachyacantha querceti Sz. T. E.
Hyperaspis paludicola Sz. T.
Scymnus quadritæniatus Lec. P.
collaris Melsh. C.
balteatus Lec. P.

EROTYLIDÆ.

Languria marginipennis Sz. M.

DERMESTIDÆ.

Attagenus piceus Oliv. Sf.

HISTERIDÆ.

Hololepta quadridentata Fabr. C.
Hister cœnosus Er. Sf.
Saprinus rotundatus Kug. Sf.
pennsylvanicus Payk. E.

TROGOSITIDÆ.

Tenebrioides semicylindrica Horn. C.

DASCYLLIDÆ.

Cyphon variabilis Thunb. M.

ELATERIDÆ.

Dromæolus striatus Lec. E.
Agrypnus sallei Lec. T.
Lacon rectangularis Say. M.
Anchastus asper Lec. M. T. E.
Monocrepidius lividus DeG. E.
  vespertinus Fabr. T. E.
Monocrepidius debilis Lec. S.
Ludius hepaticus Germ. T.
Glyphonyx testaceus Melsh. E.
  recticollis Say. T.
Melanotus clandestinus Er.T.P.

THROSCIDÆ.

Drapetes rubricollis Lec. M.

BUPRESTIDÆ.

Dicerca lurida Fabr. T.
Chrysobothris femorata var.
  alabamæ Gory. E.
  dentipes Germ. Sf.
  chrysoela Ill.T.
Acmæodera pulchella Hbst. M.
  tubulus Fabr. C.
Agrilus ruficollis Fabr. Sf.
Agrilus floridanus Cr. T.
  imbellis Cr. C.
Rhæboscelis tenuis Lec. Sf.
Taphrocerus puncticollis Sz. T.
  gracilis Say. M. C.
Brachys tessellata Fabr. P.
  ovata Web. T. M. C.
Pachyscelus purpureus Sz. C.

LAMPYRIDÆ.

Platores timidus Lec. C.
Pyropyga minuta Lec. C.
Photinus lineellus Lec. C.
Chauliognathus marginatus Fabr. M. C.
Telephorus longulus Lec. Sf.
Polemius undulatus Lec. Sf.
Lobetus abdominalis Lec. P.

MALACHIDÆ.

Temnopsophus impressus Sz. C.

CLERIDÆ.

Cymatodera undulata Say. C.
Trichodes apivorus Germ. C.
Clerus lunatus Spin. E. T.
  thoracicus Oliv. E.
Hydnocera suturalis Kl. S.
  ægra Newm. C.
Necrobia rufipes Fabr. P.

BOSTRICHIDÆ.

Xylobiops basillare Say. S.

SCARABÆIDÆ.

Canthon lævis Dru. E.
nigricornis Say. E.
Copris minutus Dru. T. S.
Onthophagus hecate Panz. E.
tuberculifrons Har. C.
pennsylvanicus Har. Sf.
Trox scabrosus Beauv. S.
Diplotaxis languida Lec. S.
Lachnosterna ephelida Say. S.
glaberrima Blanch. S.
Polyphylla occidentalis Linn. S.
Anomala marginata Fabr. Sf. M.
semilivida Lec. Sf.
Strigoderma pygmæa Fabr. Sf. C.
Pelidnota punctata Linn. E.
Cyclocephala puberula Lec. S.
immaculata Oliv. S.
Chalepus trachypygus Burm. S.
Strategus antæus Fabr. S.
julianus Burm. S.
Euphoria sepulchralis Fabr. C.
fulgida Fabr. E.
Trichius piger Fabr. C. T.
texanus Horn. M.
viridulus Fabr. T.
delta Forst. M.

CERAMBYCIDÆ.

Mallodon dasystomus Say. S.
Derobrachus brevicollis Serv. S.
Criocephalus nubilus Lec. S.
Psyrassa unicolor Rand. T.
Heterachthes ebenus Newm. C.
Plectromerus dentipes Oliv. M.
Obrium rubrum Newm. C.
Xylotrechus sagittatus Germ. S.
Strangalia strigosa Newm. M.
Euryptera lateralis Oliv. C.
Monohammus titillator Fabr. S.
Leptostylus aculiferus Say. T.
terræcolor Horn. C.
argentatus Duv. P.
Liopus minuens Hamilton, C.
Hyperplatys aspersus var. femoralis Hald. T.
Ecyrus exiguus Lec. C.
Hippopsis lemniscata Fabr. E. T.
Mecas femoralis Hald. T.
Oberea tripunctata var. myops Hald. T.
tripunctata Fabr. Sf.
ocellata Hald. Sf. M.
gracilis Fabr. T.
Tetraopes canteriator Drap. P. S.
Methia punctata Lec. Sf.

CHRYSOMELIDÆ.

Lema solani Fabr. C. P.
circumvittata Clark. S. C.
confusa Chev. C.
trilineata Oliv. Sf.
sexpunctata Oliv. var.
Typophorus canellus var. quadriguttatus Lec. M.
Metachroma quercatum Fabr. C.
puncticolle Lec. C.
pellucidum Cr. S.

Lema albini Lec. M.
Anomœa laticlavia Forst. E.
Chlamys plicata Fabr. E. C.
  tuberculata Kl. M. P.
Exema gibber Oliv. E.
  conspersa Mann. P. S. Sf.
Bassareus congestus Fabr. T. S. P.
  lituratus Fabr. Sf.
  (These include both the type form and LeConte's var. "a 3").
Cryptocephalus binominis Newm. E.
  guttulatus Oliv. Sf.
  bivius Newm. E.
  sp., near confluens Say. Sf. E.
  obsoletus Germ. E. P. C.
  aulicus Hald. E. M.
  trivittatus Oliv. P.
  pumilus Hald. C.
Griburius larvatus Newm. E. Sf. P.
Pachybrachys litigiosus Suffr. S. C.
  limbatus Newm. E.
  trinotatus Melsh. C. E. C.
  carbonarius Hald. Sf.
  3 species near atomarius Melsh P. C.
Monachus saponatus Fabr. C.
  thoracicus Cr. E.
  (The disk of the thorax is dark in the specimen, but without punctures, so it seems properly referable to this species.)
Myochrous denticollis Say. Sf.
Typophorus canellus var. aterrimus Oliv. M. E.
Graphops curtipennis Melsh. Sf.
Rhabdopterus picipes Oliv. Sf.
Colaspis brunnea var. flavida Say. S.
  favosa Say. P.
Chrysomela scalaris Lec. C.
  subopaca Rog. C.
Lina scripta Fabr. C.
Phyllobrotica costipennis Horn. S. Sf.
Diabrotica vincta Lec. M.
Trirhabda tomentosa Linn, C.
Galerucella notulata Fabr. C.
Hypolampsis pilosa Ill. P.
Œdionychis concinna Fabr. C.
  gibbitarsa Say. C.
  ulkei Horn. E.
  fimbriata Forst. Sf.
  petaurista Fabr. M.
  scalaris Melsh. C.
Blepharida rhois Forst. E.
Disonycha pennsylvanica var. conjugata Fabr. M.
  caroliniana Fabr. E.
  abbreviata Melsh. C.
  collata Fabr. M.
Haltica ignita Ill. small var. C.
  rufa Ill. Sf.
Longitarsus melanurus Melsh. C.
  testaceus Melsh. C.
Chætocnema crenulata Cr. C.
Odontota notata Oliv. P. S. E.
  bicolor Oliv. C. T.
  nervosa Panz. Sf.
Stenispa metallica Fabr. E.
Microrhopala erebus Newm. C.
Porphyraspis cyanea Say. Sf.
Coptocycla signifera Hbst. M.
  aurichalcea Fabr. M. C.
Chelymorpha argus Licht. P.

BRUCHIDÆ.

Caryoborus arthriticus Fabr. C.
Bruchus quadrimaculatus Fabr. P.
coryphæ Oliv. M.
ramicornis Boh. C. (In some doubt.)
Bruchus cruentatus Horn. T.
floridæ Horn. M.
alboscutellatus Horn. C.
seminulum Horn. S.

TENEBRIONIDÆ.

Epitragodes tomentosus Lec. C. M. E.
Glyptotus cribratus Lec. T.
Crypticus obsoletus Say. S.
Uloma punctulata Lec. C.
Opatrinus notus Say. S. C.

CISTELIDÆ.

Lobopoda punctulata Melsh. T.
Hymenorus dorsalis Sz. T.
Hymenorus densus Lec. E.

LAGRIIDÆ.

Statira croceicollis Makl. T.

OEDEMERIDÆ.

Copidita suturalis Lec. E. P.
thoracica Fabr. E.
notoxoides Lec. C.
Oxacis tæniata Lec. C.
Asclera erythrocephala Germ. C.

MORDELLIDÆ.

Mordella scutellaris Fabr. S. C.
Mordellistena bicinctella Lec. C.
semiusta Lec. C.
Mordellistena fuscata Melsh. S.
amica Lec. C.

ANTHICIDÆ.

Notoxus filicornis Csy. E. P.

MELOIDÆ.

Nemognatha piezata Fabr. Sf.
nemorensis Hentz. S.
Epicauta strigosa Gyll. C. S. (The series includes both the unicolorous and striped forms.)

RHIPIPHORIDÆ.

Rhipiphorus octomaculatus Gerst. T.
Rhipiphorus pectinatus Fal. E.
cruentus Germ. T.

RHYNCHITIDÆ.

- Rhynchites hirtus Oliv. M.

ATTELABIDÆ.

- Attelabus analis Ill. E. S.

OTIORHYNCHIDÆ.

- Epicærus formidolosus Boh. P.
- Neoptochus adspersus Boh. P. E.
- Pachnæus opalus Olive. C. E.
- Tanymecus lacæna Hbst. M.
- Pandeletejus hilaris Hbst. T. C.
- Eudiagogus pulcher Fahræus. C.

CURCULIONIDÆ.

- Apion metallicum Gerst. T.
- Listronotus setosus Lec. T.
- Hyperodes hornii Dietz. P.
  - cryptops Dietz. M.
- Pachylobius picivorus Germ. S.
- Lixus fossus Lec. S.
  - tenellus Csy. C.
- Smicronyx sp. C.
- Onychilis nigrirostris Boh. C.
- Endalus ovalis Lec. C.
- Otidocephalus dichrous Lec. C.
- Anthonomus signatus Say. C.
  - musculus Say. C.
- Plocetes ulmi Lec. M.
- Notolomus basalis Lec. S.
- Læmosaccus plagiatus Fabr. S.
- Conotrachelus posticatus Boh. M.
- Chalcodermus æneus Boh. M.
- Cryptorhynchus apiculatus Gyll. M., (in some doubt).
- Copturus nanulus Lec. C.
- Perigaster obscurus Lec. C. P.
- Pelenomus sulcicollis Fabr. C.
- Baris interstitialis Say. C.
  - ærea Boh. M.
- Odontocorynus scutellum-album Say. P. C.
- Geræus picumnus Hbst. C. S.
- Limnobaris confusa Boh. M.
- Barinus linearis Lec. C.
  - bivittatus Lec. C.

CALANDRIDÆ.

- Cossonus impressifrons Boh. C.

ANTHRIBIDÆ

- Phœnicobius chamæropis Lec. C. E.
- Cratoparis lunatus Fabr. C.

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